D1.1

Project Management Plan

Project title: **Enhancing Integration and Interoperability of CCAM eco-system**

Project acronym: **IN2CCAM**

Horizon Research and Innovation Actions
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in2ccam.eu

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Quality Control

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0.2	20/01/2023	Giuliana Rotunno, Daniele Pagano, Walter Ukovich, Paolo Ferrari	Deliverable ready for peer review
1.0	26/04/2023	Giuliana Rotunno, Daniele Pagano, Walter Ukovich, Paolo Ferrari	Final Version. Deliverable updated with peer review comments

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ABBREVIATIONS AND ACRONYMS

Abbreviation	Meaning
AI	Artificial Intelligence
API	Application Programming Interface
BEN	Beneficiary
CA	Consortium Agreement
CAV	Connected Automated Vehicles
CCAV	Centre for Connected and Autonomous Vehicles
C-ITS	Cooperative Intelligent Transport Systems
COO	Project Coordinator
D	Deliverable
DNN	Deep Neural Networks
DPM	Data Management Plan
DRL	Deep Reinforcement Learning
DT	Digital Twin
DTN	Digital Twin Network
EC	European Commission
EU	European Union
G5	5th generation
G6	6th generation
GDPR	General Data Protection Regulation
ICT	Information and Communication Technologies
IoT	Internet of Things
IPR	Intellectual Property Rights
KPI	Key Performance Indicator

LL	Living Lab
LTE	Long Term Evolution
MaaS	Mobility-as-a-Service
MS	Milestone
ROC	Remote Operation Centre
SAE	Society of Automotive Engineers
SUMP	Sustainable Urban Mobility Plans
T	Task
TCC	Traffic Control Centre
TC	Task Coordinator
TMC	Traffic Message Channel
TMT	Technical Management Team
UAV	Unmanned Aerial Vehicles
UC	Use Case
UHD	Ultra-High Definition
UUV	Unmanned Underwater Vehicles
V2I	Vehicle to Infrastructure
V2P	Vehicle to Pedestrian
V2V	Vehicle to Vehicle
V2X	Vehicle-to Everything
VRU	Vulnerable Road User
WP	Work Package

1 EXECUTIVE SUMMARY

1.1 IN2CCAM D1.1 Executive Summary

This document provides an extensive analysis of the project management plan comprising the work packages structure, the work and time plan for each task and subtask, the role of each partner per task as well as the dependencies between tasks. Indications on administrative, financial processes and internal communication activities, such as Technical Management Team meetings, WP meetings and General Assemblies will be specified in the description of the related Work Packages and individual Tasks. The information reported is based in the IN2CCAM Grant Agreement, the Consortium Agreement and the initial partners' discussions during the first months of the project.

The Project Coordinator (COO) is **POLIBA** – Politecnico di Bari.

The Technical Management Team (TMT) is the Project management group, chaired by the coordinator and combining the WP leaders (POLIBA, ICCS, GLS, LIST, TTS ITALIA, ERTICO ITS EUR).

The project work breakdown structure has been extensively analysed adopting a top-down approach. Work Package (WP) and WP Coordinators are:

- **WP1**: Project management and quality assurance. Lead: **POLIBA**.
- **WP2**: User's needs, perceptions and expectations about CCAM ecosystem. Lead: **ICCS**.
- **WP3**: Architectural and technical specifications for CCAM Services development, integration, intermodal interfaces and interoperability. Lead: **GLS**.
- **WP4**: Demonstrations, coordination and implementation. Lead: **POLIBA**.
- **WP5**: Evaluation and impact assessment. Lead: **LIST**.
- **WP6**: Evidence-based guidance, policies and regulatory recommendations for CCAM services. Lead: **TTS ITALIA**.
- **WP7**: Communication, Awareness, Dissemination and Exploitation. Lead: **ERTICO ITS EUR**.

Initially, the work packages are briefly presented and the synergies among them are identified. Afterwards, each WP is decomposed into their respective tasks serving multiple objectives.

Finally, this document extends the work breakdown in the Grant Agreement by decomposing each task to multiple subtasks, each one of which is dedicated to serve a specific goal, and by defining a detailed time plan for the subtasks' progress.

Furthermore, the dependencies between tasks have been identified facilitating the monitoring of the work progress and the identification of the impact that deviations in any task will have in project activities.

The role of each partner per task and subtask has been identified, facilitating the monitoring of the work progress and enabling the early tracking of potential delays from partners.

This document will be maintained as a living document tracking all the project activities and advancements towards project objectives and work plan on a continuous basis. Considering this, potential risks will be detected at early stage and a contingency plan will be specified by the risk management process.

This document is the first version of the project management plan delivered in month 6 of the project. The next two versions of the project management plan are scheduled for months 18 and 36 of the project and will incorporate a section reporting the project advancements towards the project objectives.

2 INTRODUCTION

2.1 Project intro – IN2CCAM concept and approach

The IN2CCAM project (in extenso: Enhancing Integration and Interoperability of CCAM eco-system) is an Innovation Action referring to the Horizon Europe call HORIZON-CL5-2022-D6-01-04: Integrate CCAM services in fleet and traffic management systems (CCAM Partnership).

IN2CCAM aims to design, implement and integrate the three following main challenges: updating new physical infrastructures, using and updating novel digital infrastructures and proposing suitable operational infrastructures. In order to reach such general objectives, the overall methodology of IN2CCAM is based on the definition, organisation, implementation and evaluation of a set of Living Labs (LLs) that will be the basis for implementing a full integration of CCAM services in the transport system.

According to the LL methodology and approach, IN2CCAM activities focus on the user and the open innovation ecosystem, operating in 6 territorial contexts and integrating innovation and research processes in a partnership between public and private entities. The concept is based on a systematic co-creation approach and integrated innovation processes. These processes will be integrated through the co-creation, exploration, experimentation and evaluation of innovative services, scenarios, concepts and related technological solutions in real use cases of CCAM.

IN2CCAM consortium, according to the vision of Horizon Europe framework programme from 2021-2027 that aims to accelerate the implementation of innovative CCAM technologies and systems for passengers and goods, intends to develop, implement and demonstrate innovative services for connected and automated vehicles, infrastructures and users. The goal is providing benefits to all citizens by implementing a full integration of CCAM services in the transport system. The main expected positive impacts for society are: i) safety (i.e., reducing the number of road accidents caused by human error; ii) environment (i.e., reducing transport emissions and congestion by smoothening traffic flow and avoiding unnecessary trips); iii) inclusiveness (i.e., ensuring inclusive mobility and good access for all).To this aim the approach is based on the implementation and integration of enhanced Physical, Digital and Operational Infrastructures to enrich CCAM services and increase safety and traffic efficiency.

2.2 Purpose of the deliverable D1.1

The aim of this deliverable is to provide an overview of the project work plan, including schedule per WP, tasks, responsible partners, related subtasks, related deliverables, dependencies with other tasks, a Gantt chart and a Work Breakdown Structure.

2.3 Intended audience

This deliverable is confidential only for members of the consortium and Commission Services.

2.4 Structure of the deliverable and its relation with other work packages/deliverables

This deliverable aims to provide an overview of the project management. Initially, an overview of the overall work plan structure is provided in terms of work package structure and project time plan. Afterwards, the work plan of each WP is decomposed in several tasks, deliverables and milestones. Finally, each task is further decomposed to several sub-tasks.

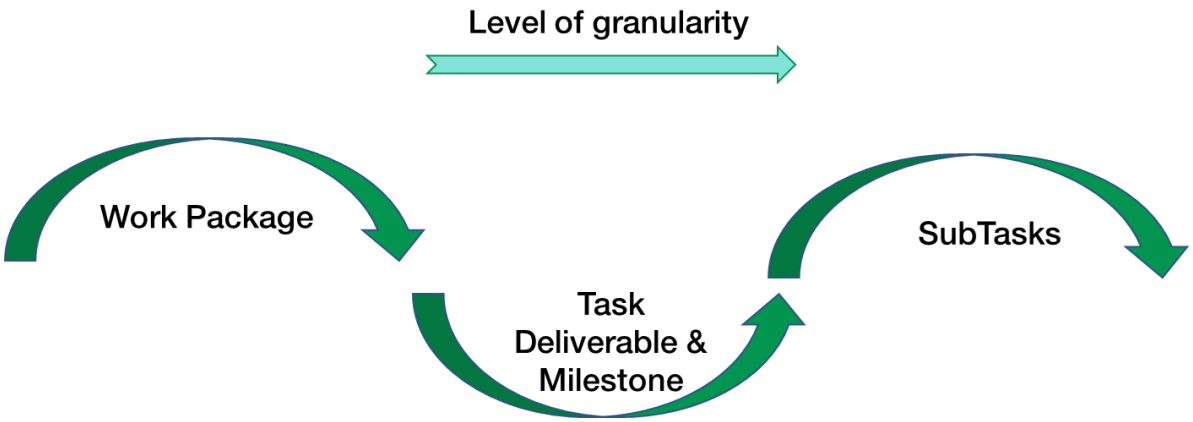

Figure 1: Project work plan, top-down approach

3 PROJECT WORK BREAKDOWN STRUCTURE

3.1 Work Packages

The project is divided in seven WPs, as illustrated in Table 1.

Table 1: List of work packages

No	Title	Lead Beneficiary	Start Month	End Month
WP1	*Project Management and Quality Assurance*	*POLIBA*	*1*	*36*
WP2	*Users' needs, perceptions and expectations about CCAM ecosystem*	*ICCS*	*1*	*8*
WP3	*Architectural and technical specifications for CCAM Services development, integration, intermodal interfaces and interoperability*	*GLS*	*6*	*21*
WP4	*Demonstrations coordination and implementation*	*POLIBA*	*12*	*29*
WP5	*Evaluation and impact assessment (by real data and simulation data)*	*LIST*	*14*	*33*
WP6	*Evidence-based guidance, policies and regulatory recommendations for CCAM services*	*TTS*	*1*	*36*
WP7	*Communication, Awareness, Dissemination and Exploitation*	*ERTICO*	*1*	*36*

The work breakdown structure is based on the guidelines of the FESTA European project; thus, it is divided into three phases: preparation, usage and analysis, as illustrated in Figure 2. These phases are briefly analysed within the next paragraphs.

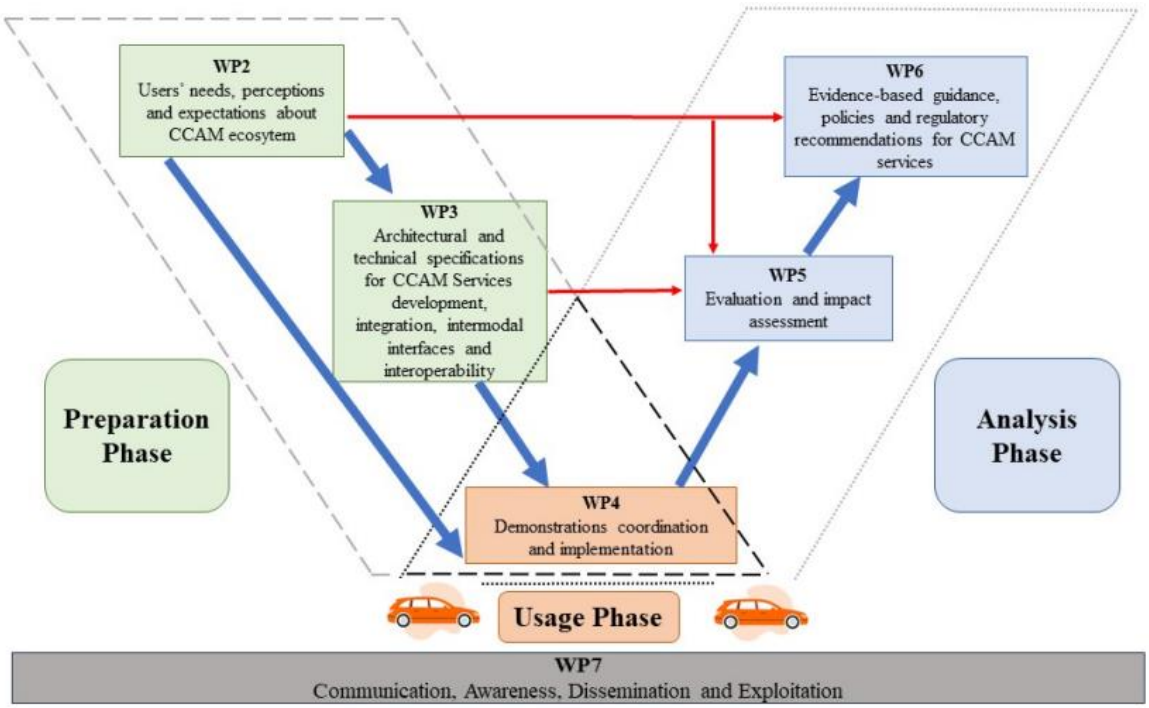

Figure 2: Project pert diagram

- ***Preparation Phase (WP2-WP3):***

The preparation phase starts by the WP2, which is dedicated to set the basis as regards the traffic and fleet management innovative implementations and deployments. WP2 is connected with Task T6.1, which will develop a dedicated public engagement strategy to define the project's local, National and European approach to engage project stakeholders. Moreover, WP2 will identify the mobility needs, concerns and requirements of different user groups as well as of different stakeholders (fleet and traffic operators, cities, legislators, service providers). The existing infrastructure, traffic rules and governance models of the traffic management will be analysed and the gaps that the project is trying to bridge will be highlighted, in order to provide services and strategies for successful traffic management with CCAM systems' integration.

Moreover, the use cases in each LL will aim to integrate CCAM ecosystem within the demo site, including the best integration of CCAM in the transport networks in WP2 and the study questions and the KPIs to be used for the analyses will be defined. In addition, WP3 will establish technical specifications to enable the interface between the infrastructure and vehicles and to guarantee interoperability between different actors. In the WP3, CCAM services will be developed and integrated in the existing ITS in different fields by defining intermodal interfaces: shared mobility, network load balancing and goods management and delivery. Advanced simulation models will be designed in T3.5 to analyse the impact of the proposed CCAM services in a virtual environment. In addition, the DT components and the optimal control algorithms are proposed on the basis of AI technologies such as DNN and DRL.

- ***Usage Phase (WP4):***

In the usage phase, new physical, digital and operational infrastructures will be implemented in each Lead LL. To this aim, in WP4 all the systems and services will be verified, so that they operate properly in each LL before the demonstrations start. Existing ICT services will be integrated with the new CCAM services and solutions implemented in the Lead LLs and the activities in the demonstration areas will be coordinated to ensure that users actively participate in the demonstrations and that needed data are collected. Moreover, the Lead and Follower LLs will provide data and use cases, in order to simulate the CCAM ecosystem in large scale by forecasting future results, benefits and barriers.

- ***Analysis Phase (WP5 - WP6):***

In the analysis phase, a framework for impact assessment will be set up, based on similar KPIs as those used for a priori analyses, to measure the performance of the solutions in each LL and their impact on the CCAM ecosystem. Test methods will be proposed and a specific testing environment that includes CCAM simulation tool will be used to test the interoperability of end-to-end communication by each partner. Moreover, real traffic conditions analysis, using advanced simulation models and tools and real-world data, will be simulated considering all the LLs. Using the demonstration results, an evidence-based governance framework, business models, policy and regulatory recommendations for widespread adoption of IN2CCAM innovation will be executed in WP6. Specific objectives will be designing an inclusive evidence-based framework for an effective governance of CCAM-enabled traffic and fleet management solutions, meeting needs of policy makers, regulatory authorities, service providers and transport operators. In addition, new cost-efficient multi-stakeholder business and operating models will be proposed for an efficient integration of CCAM and fleet and traffic management systems, based on the sharing of both benefits and risks associated with the future operation of the IN2CCAM innovation. The final output will be regulatory and policy recommendations targeted at EU and international decision makers, proposing actions to facilitate widespread of the IN2CCAM innovations, so as to convince stakeholders to invest in CCAM infrastructure.

3.2 Tasks and interdependencies

There are several interdependencies at WP level during the whole duration of the project. For this reason, it is essential to efficiently monitor the progress of activities, the quality of delivery and the impact of potential delays in the project workflow. In this respect, it is necessary to keep in mind two main aspects: the Gantt chart of the project tasks and the dependencies matrix, both of them represented in the next figures.

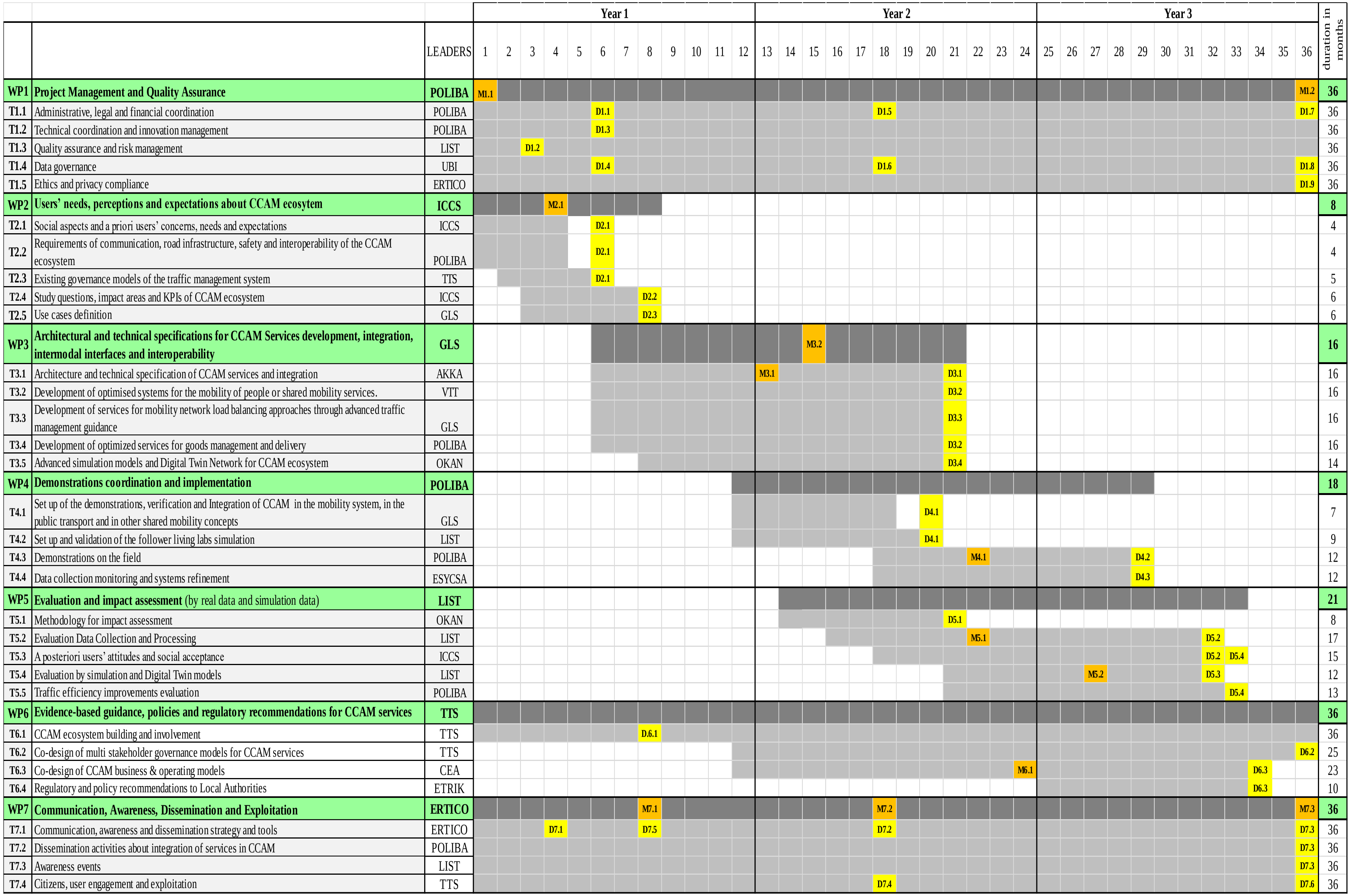

Figure 3: Gantt chart

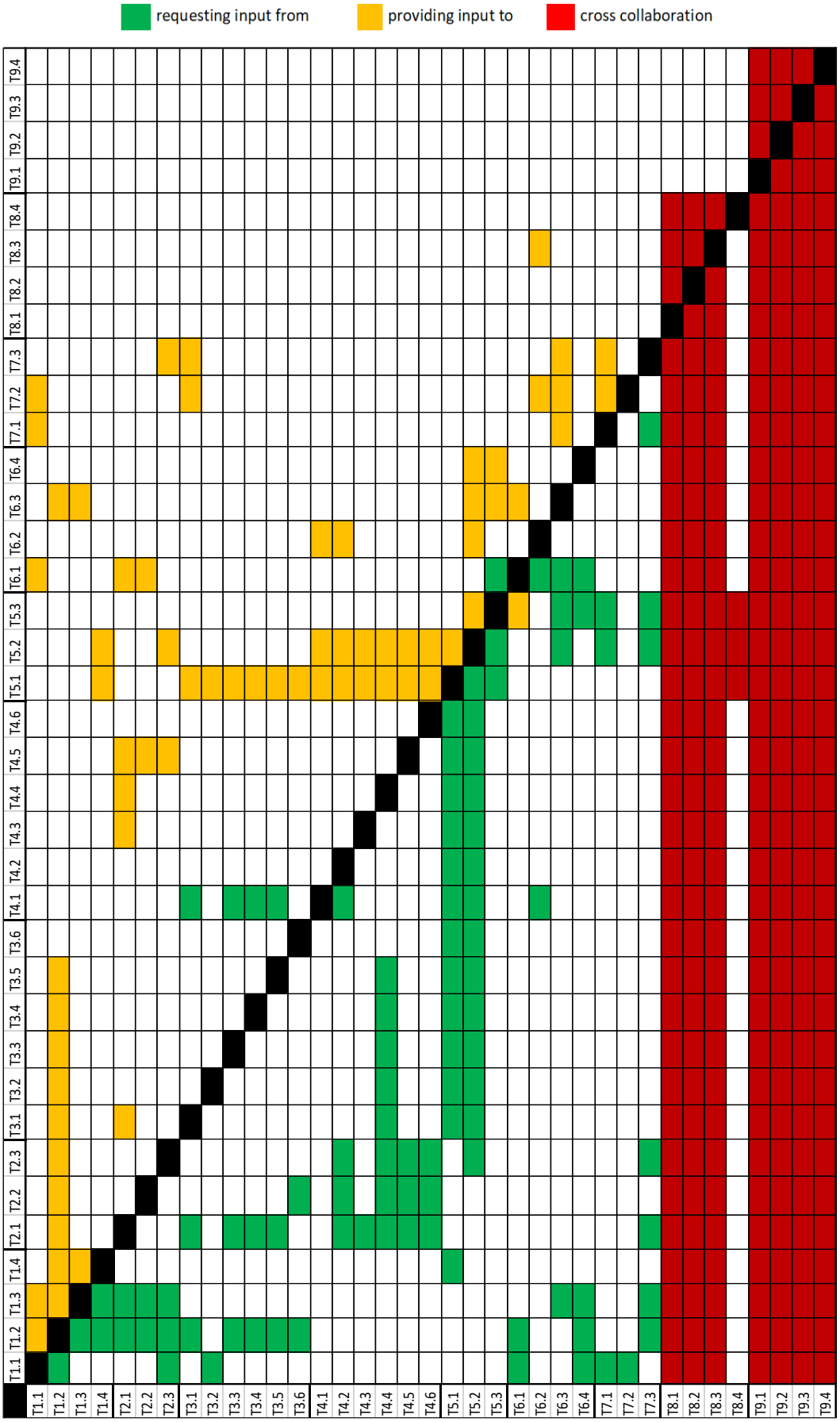

Figure 4: Task interdependencies

3.3 List of Deliverables

Table 2: List of Deliverables

No	Name	WP	Leader	Type	Dis. Level	Due Date
D1.1	*Project management plan - First update*	*1*	*POLIBA*	*R*	*PU*	*M06*
D1.2	*Quality management plan*	*1*	*LIST*	*R*	*PU*	*M03*
D1.3	*Innovation management plan*	*1*	*POLIBA*	*R*	*PU*	*M06*
D1.4	*Data Management Plan - First update*	*1*	*UBI*	*R*	*PU*	*M06*
D1.5	*Project management plan - Second update*	*1*	*POLIBA*	*R*	*PU*	*M18*
D1.6	*Data Management Plan - Second update*	*1*	*UBI*	*R*	*PU*	*M18*
D1.7	*Project management plan - Final report*	*1*	*POLIBA*	*R*	*PU*	*M36*
D1.8	*Data Management Plan - Final report*	*1*	*UBI*	*R*	*PU*	*M36*
D1.9	*Ethics and privacy compliance addresses*	*1*	*ERTICO*	*R*	*PU*	*M36*
D2.1	*Existing mobility needs, road infrastructure and governance models*	*2*	*ICCS*	*R*	*PU*	*M06*
D2.2	*Study questions and KPIs of CCAM ecosystem*	*2*	*ICCS*	*R*	*PU*	*M08*
D2.3	*Use cases definition*	*2*	*GLS*	*R*	*PU*	*M08*
D3.1	*CCAM services architecture description*	*3*	*AKKA*	*R*	*PU*	*M21*

D3.2	*Optimization of multimodal mobility services and goods management and delivery systems*	*3*	*VTT*	*R*	*PU*	*M21*
D3.3	*Mobility network load balancing solutions*	*3*	*GLS*	*R*	*PU*	*M21*
D3.4	*CCAM advanced simulation models and digital twin designs*	*3*	*OKAN*	*R*	*PU*	*M21*
D4.1	*Demonstrations' set-up and verification activities*	*4*	*GLS*	*R*	*PU*	*M20*
D4.2	*Report on demonstrations activities*	*4*	*POLIBA*	*R*	*PU*	*M29*
D4.3	*IN2CCAM data repository and system refinement*	*4*	*ESYCSA*	*R*	*PU*	*M29*
D5.1	*Impact assessment methodology*	*5*	*OKAN*	*R*	*PU*	*M21*
D5.2	*Data and impact assessment for user and social attitudes*	*5*	*ICCS*	*R*	*PU*	*M32*
D5.3	*Scalability study – Simulation and Digital Twin approaches*	*5*	*LIST*	*R*	*PU*	*M32*
D5.4	*Impacts on mobility and traffic efficiency from the usage of CCAM vehicles*	*5*	*POLIBA*	*R*	*PU*	*M33*
D6.1	*IN2CCAM public engagement strategy*	*6*	*TTS*	*R*	*PU*	*M08*
D6.2	*Governance models and regulatory and policy recommendations for future-proof deployment of IN2CCAM innovations*	*6*	*TTS*	*R*	*PU*	*M36*

D6.3	*Business and operating models*	*6*	*CEA*	*R*	*PU*	*M34*
D6.4	*Regulatory and policy recommendations to Local Authorities*	*6*	*E-TRIK*	*R*	*PU*	*M34*
D7.1	*Dissemination and Communication plan - First update*	*7*	*ERTICO*	*R*	*PU*	*M04*
D7.2	*Dissemination and Communication plan - Second update*	*7*	*ERTICO*	*R*	*PU*	*M18*
D7.3	*Dissemination and Communication Final report*	*7*	*ERTICO*	*R*	*PU*	*M36*
D7.4	*Exploitation plans - First update*	*7*	*TTS*	*R*	*PU*	*M18*
D7.5	*Liaison plan*	*7*	*ERTICO*	*R*	*PU*	*M08*
D7.6	*Exploitation plans - Final report*	*7*	*TTS*	*R*	*PU*	*M36*

3.4 List of Milestones

Table 3: List of Milestones

No	Name	WP	Due Date	Type
MS1	*Kick-off and introduction of partners*	*WP1*	*M1*	*Kick-off meeting is held and all partners had detail introduction and technical work aims explained*
MS2	*Project Successfully Completed – final report*	*WP1*	*M36*	*All activities are to finish and all activity reports are being written for final consolidation and review by the EC.*
MS3	*Use cases completed and validated by the stakeholders*	*WP2*	*M4*	*Use cases released and validated for each pilot site.*

	groups per pilot site			
MS4	*Complete architecture and specifications for all LLs delivered*	*WP3*	*M13*	*Architecture and specifications re-leased and validated*
MS5	*A prototype of all systems, services and simulation tools for demonstration*	*WP3*	*M15*	*Software released and validated in each pilot site*
MS6	*Verification activities and demonstration in each LL*	*WP4*	*M22*	*Pilot site integration and deployment verified and ready for demonstration*
MS7	*Data collection report ready*	*WP5*	*M22*	*The data necessary for starting demonstration are collected*
MS8	*Digital Twin evaluation framework ready*	*WP5*	*M27*	*The models for the DT are determined*
MS9	*Initial business and operating models*	*WP6*	*M24*	*Initial business models are finalized*
MS10	*Communication tools deployed*	*WP7*	*M8*	*Website & roll-out ready*
MS11	*Exploitation plan finalised*	*WP7*	*M18*	*Exploitation plan finalized*
MS12	*Dissemination, Communication and Final exploitation, Final Event*	*WP7*	*M36*	*Dissemination plan finalized*

4 WP1 PROJECT MANAGEMENT AND QUALITY ASSURANCE

4.1 Task 1.1: Administrative, legal and financial coordination

The responsible for this Task is POLIBA. LINKS and CEA participate to its activities.
POLIBA is also responsible of the TMT.
Activities in this task are organised as follows:

- General project administration for financial and resource control. POLIBA and all partners will allocate enough administrative staff time to enable project coordination to be successfully achieved, including project reporting control, cost claims, administrative checks, fund distribution, human resources, etc.
- Project management to:
  - promote a clear, common project vision and objectives definition; communicate with the EU and prepare all project management documentation, including the required financial reports;
  - ensure on-time schedule;
  - promote equal treatment between men and women;
  - encourage and support participation of women at all levels of the project - all partners are committed to provide equal opportunities policy in their human resource selections.
  - Effort tracking, technical progress monitoring and financial reporting: POLIBA will ensure that project spending is in sync with the technical project with regular effort reports.

4.2 Task 1.2: Technical coordination and innovation management

The responsible for this Task is POLIBA. GLS participates to its activities.
T1.2 ensures seamless and efficient coordination of the different activities between the WPs. This task will directly involve a management group, chaired by the coordinator and combining the WP leaders, namely the Technical Management Team (TMT). Also, it ensures that the final results of the project are implemented to best meet the market needs with the newly developed technologies and ensure that this paves the way for a long-term evolution. Monitor the activities of all WPs with regular teleconferences: identify technical risks or deviations and advise and consult the coordinator/responsible partner to take corrective actions.

4.3 Task 1.3: Quality assurance and risk management

The responsible for this Task is LIST. POLIBA participates to its activities.

This task aims to ensure the quality of the deliverables and monitor all quality procedures and evaluations carried out in the project. A quality control strategy has been defined early in the project in agreement with all partners. The Quality Manager of the IN2CCAM project has been appointed by the Task Manager LIST: Marie-Laure Watrinet (LIST) has been identified for this role.

In addition, each WP has a dedicated Quality and Risk Owner:

- **WP1**: Paolo Ferrari (POLIBA).
- **WP2**: Jason Sioutis (ICCS).
- **WP3**: André Perpey (GLS).
- **WP4**: Agostino Marcello Mangini (POLIBA).
- **WP5**: Juan Carlos Estrada (LIST).
- **WP6**: Gennaro Ciccarelli (TTS ITALIA).
- **WP7**: Coen Bresser (ERTICO ITS EUR).

A peer review system is established, conducted by representatives of each partner, and criteria are set in the form of a checklist, towards which all project deliverables will be reviewed. Additionally, it will be assured that the project is running according to laid down management principles and that reporting activity is of high quality.

4.4 Task 1.4: Data governance

The responsible for this Task is UBIWHERE. POLIBA participates to its activities.

This task is devoted to the preparation of the Data Management Plan (DMP) which will provide information from all partners about the data used in the project. The DMP will be kept up to date throughout the project with developments and available results. The DMP updates will be included in the periodic management reports. DMP will also assist the partners that generate or collect research data, to ensure the work under fair principles. A Data Manager of the IN2CCAM project has been appointed by the Task Manager UBIWHERE: Sofia Almeida (UBIWHERE) has been identified for this role.

The Data Manager will:

- identify and describe the evaluation data that will be collected, processed or generated;
- define what data will be made publicly available for research purposes and what sensitive data will not be shared because of IPR or confidentiality issues;
- specify the different types of data and the methodologies and tools for collecting, storing, curating, preserving and sharing the data;
- ensure data protection and compliance with regulation on the protection of private data (GDPR).

4.5 Task 1.5: Ethics and privacy compliance

The responsible for this Task is ERTICO ITS EUR. POLIBA participates to its activities.
This task will develop ethics requirements for project activities to ensure that Horizon Europe ethics guidelines are applied, regardless of the country in which activities are carried out. Focus will be on how to deal with end-users participating in demonstration activities, and on the protection of personal data; how to handle personal data collected and stored during demonstrations for evaluation activities. Moreover, a single point of reference will be provided for the quality management processes implemented during the project and will be addressed on the misuse of technology. One of the activities of IN2CCAM is the analysis and evaluation of the social acceptance and social impact of the IN2CCAM innovations a priori and after the lead Living Labs demonstrations. To do so, data will be collected both from desk research (state of the art) and from surveys and consultations of the stakeholders, including vulnerable road users and marginalized communities. The personal data collected by the project activities are the following: name, email, gender, age, disability and will be treated according to the General Data Protection Regulation (EU) 2016/679. No sensitive data will be collected. Anonymous data, necessary for the scientific analyses, will be stored in the project repository adhering to all privacy and security measures. No personal data will be exchanged between partners. Each partner who provides or otherwise make available to any other partner data, will declare that:

- it has the authority to disclose such data which it provides to the partners;
- where legally required and relevant, it has obtained appropriate informed consents from all the individuals involved, or from any other applicable institution, all in compliance with applicable regulations;
- there is no restriction in place that would prevent any such other partner from using such data for the purpose of the project. Concerning the application of the AI in the services optimization, the approach will follow the key prerequisites for ethically sound AI systems: AI solutions will only support human autonomy and decision-making, guarantee privacy, data protection and transparency.

4.6 WP1 Partners involved

Table 4: WP1 Partner Involved

WP1 Tasks	Lead partner	Participants
T1.1	*POLIBA*	*LINKS, CEA*
T1.2	*POLIBA*	*GLS*
T1.3	*LIST*	*POLIBA*

T1.4	*UBI*	*POLIBA*
T1.5	*ERTICO*	*POLIBA*

4.6.1 WP1 Gantt chart

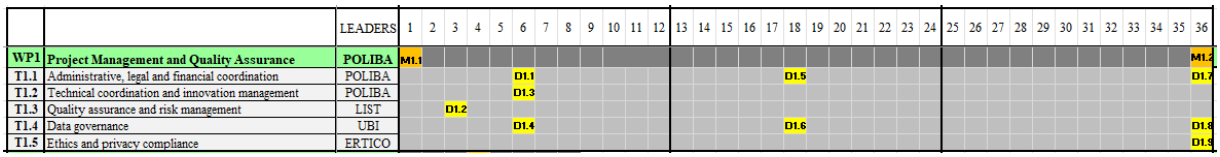

Figure 5: WP1 Gantt chart

4.6.2 WP1 Dependencies

In WP1 there are no dependencies with other WPs and Tasks.

4.6.3 WP1 Related Deliverables and Milestones

Table 5: WP1 Related Deliverables

No	Deliverable Name	Due Date
D1.1	*Project management plan - First update*	*M06*
D1.2	*Quality management plan*	*M03*
D1.3	*Innovation management plan*	*M06*
D1.4	*Data Management Plan - First update*	*M06*
D1.5	*Project management plan - Second update*	*M18*
D1.6	*Data Management Plan - Second update*	*M18*
D1.7	*Project management plan - Final report*	*M36*
D1.8	*Data Management Plan - Final report*	*M36*

D1.9	*Ethics and privacy compliance addresses*	*M36*

Table 6: WP1 Related Milestones

No	Milestone Name	Due Date	Means of verification
MS1	*Kick-off and introduction of partners*	*M01*	*Kick-off meeting is held and all partners had detail introduction and technical work aims explained*
MS2	*Project Successfully Completed – final report*	*M36*	*All activities are to finish and all activity reports are being written for final consolidation and review by the EC.*

5 WP2 USERS' NEEDS, PERCEPTIONS AND EXPECTATIONS ABOUT CCAM ECOSYTEM

5.1 Task 2.1: Social aspects and a priori users' concerns, needs and expectations

In this task, a detailed analysis of the mobility needs of different groups relevant to the project (e.g. vulnerable users, elderly, women, etc.) will be done by literature review of existing reports and projects as well as by a priori surveys in each LL involving key stakeholders and citizens. To this aim a set of surveys, semi-structured interviews, on-line questionnaires, feedback and satisfaction pods, structured/focused/standardized questionnaires will be performed in all the LLs. A focus on gaps where certain mobility needs are not met, which could be potentially filled by CCAM solutions, will be done. Mobility needs will be also discussed in the context of economic, social and environmental objectives. The first outputs of this task consist in a general theoretical framework about mobility needs relevant for CCAM solutions and an analysis of needs and gaps of different user groups. The task will also try to develop a better understanding of the vision, priorities and dilemmas of the key stakeholders of the CCAM value chain, based on literature and projects review - industry, insurers, legislators, regulators, infrastructure managers, service providers and transport operators - on how best to 'bundle' the various offered CCAM applications, so that they provide better value for money following in parallel a user centered approach towards inclusive mobility solution.

5.2 Task 2.2: Requirements of communication, road infrastructure, safety and interoperability of the CCAM ecosystem

This task will perform an analysis of the state of the art and the requirements of the CCAM eco-system: communication, road infrastructure, safety and interoperability. In particular, starting from the outputs of the projects already carried out, the requirements of the following technological aspects will be analysed:

- connectivity availability to ensure (cyber)secure and safe communications respecting privacy and trust;
- feasible and sustainable concepts for road infrastructure coverage (short range and cellular long-range) of connectivity to enable CCAM services also using data from external sources through V2X communication;
- interoperability requirements of external data also considering cross border issues (road authorities and operators on a national, regional and city level);
- C-ITS services including messages and message sets;

- configuration of CAV platooning;
- identification of a minimum set of necessary adaptations on the infrastructure side (physical, digital, operational) to support CCAM and above all mixed traffic situations;
- harmonization of information to be exchanged: type, format and content of information coming from external parties;
- infrastructure data via relevant communication systems in a harmonized way (e.g. in the same format - semantics and syntactics - as well as harmonizing data provision in every country/region/city);
- infrastructure support levels for CAVs;
- goods management and delivery involving CAVs;
- European cross-border issues to investigate and develop secure and trustworthy interaction between vehicles, infrastructure and third-party services.

5.3 Task 2.3: Existing governance models of the traffic management system

The aim of this task is to provide a detailed overview of the governance models currently in place in the Lead and Follower cities to deliver the existing strategies and solutions managing transport demand and traffic congestion across the whole city. In a city with CCAM services, cooperative intelligent transport systems (C-ITS) act as a central control tower managing traffic operations at a city-scale, allowing to build an eco-system in which all CCAM vehicles connect with each other's and to the roadside infrastructure to dynamically improve traffic operations and transport network performances. The investigation of governance models that will be addressed to characterize the operation of the existing traffic management solutions in the IN2CCAM cities include the following ones:

- review of city's traffic patterns, congestion issues (both recurring and non-recurring congestion) and adopted strategies and solutions;
- institutional mandates and responsibilities of all actors in the traffic management value chain;
- city's strategic priorities, budget and need for external financing;
- program design (e.g., quality and use of key performance and value for money indicators);
- procurement frameworks;
- delivery (e.g., recurring traffic management progress reports on congestion mitigation and demand management performance);
- sustainability (e.g., established benchmarks for periodic maintenance of assets and subsequent budget allocations);
- information dissemination (e.g., transparency and timeliness of annual budget and expenditure disclosures).

This task will depict the current models and arrangements required to successfully operate the existing traffic management strategies and solutions in the IN2CCAM's LLs; these will be used in Task 6.2, based on the outcomes of the project demonstration activities and through discussions with the cities, to further develop the governance frameworks and related conditions that are required for a fully functioning integrated CCAM-driven traffic and fleet management eco-system.

5.4 Task 2.4: Study questions, impact areas and KPIs of CCAM ecosystem

This task will formulate detailed study questions for each of the areas of analysis envisaged in WP5. For each of the questions, based on the use cases of Task 2.5, a set of KPIs will be selected and used to carry out the analyses of the collected data. The KPIs will take into account the specifications of the Lead and Follower LLs, namely the CCAM vehicles and services deployed, the specific use cases and the targeted users and relevant stakeholders. This task will define the KPIs that will be used for the evaluation, the formulas for computing them and the data that will be collected during the demonstration. The current views on the indicators to be used are:

- usage indicators: these are relevant to the trip characteristics (Galileo Satellite data, trip origin and destination, trip time and duration, distance, speed, acceleration), the battery state of charge at start and end of the trip, the users' trip experiences, experienced problems when interacting with other traffic participants and road elements, any incompatibilities with charge solutions, the users' feeling of comfort, etc.;
- traffic efficiency indicators: quantification of the performance in terms of traffic efficiency covering a variety of aspects such as mobility, reliability, operational efficiency and system condition and performance and how these affect other road users and specific user groups;
- traffic safety indicators: quantification of the solutions' performance in terms of exposure (the amount of travel), accident rate (the risk of accident per unit of exposure) and accident severity (the outcome of accidents concerning injuries);
- acceptance indicators: these are relevant to the level of acceptance, frequency of use, willingness to use and general attitudes of people towards CCAM, barriers to use and the impact of CCAM and of the provided services and tools on quality of life;
- quality of service indicators: they will be used to assess whether the deployed services and ICT tools in each LL are accepted and how they may affect users' attitudes towards CCAM;
- environmental indicators: they will be used to assess the impact of CCAM integration in the viability system in general, of the quality of life and of the environment in the urban context;

- economic indicators: they will be used in WP5 for the business model analysis for different categories of users and stakeholders and will include indicators relevant to time savings, cost of re-charging, cost of parking. The task will produce a list of KPIs and questions to be used as the standard framework in the LLs of the project.

5.5 Task 2.5: Use cases definition

Use cases will be defined in each LL based on pre-defined needs by local authorities and stakeholders. These use cases will be updated and detailed by integrating the needs, concerns and expectations analysed and defined in Task 2.1. The use cases will be completed with their respective scenarios which will be implemented at each LL site. The test cases and scenarios corresponding to these use cases will be defined. Use case definition will include the infrastructure and traffic management needs (ITS, connectivity, road infrastructure, type of vehicle, level of automated driving) as defined in Task 2.2 and 2.3, as well as the data requirements for calculating the KPIs of Task 2.4. The defined use cases will be compared between LLs, in order to find overlaps and propose an interoperability framework, based on open standards best suited for the use cases and features defined in WP2.

5.6 WP2 Partners involved

Table 7: WP2 Partners involved

WP2Tasks	Lead partner	Participants
T2.1	*ICCS*	*POLIBA, VIGO, TAMPERE, BARI, ETRIK, OKAN, QUAD, TTS, CEA*
T2.2	*POLIBA*	*ACASA, AKKA, VIGO, TAMPERE, BARI, ETRIK, ESYCSA, LINKS, ICCS, OKAN, LIST, GLS, QUAD, TTS*
T2.3	*TTS*	*5T, VIGO, TAMPERE, BARI, ETRIK, ESYCSA, QUAD, TTS*
T2.4	*ICCS*	*POLIBA, ACASA, AKKA, VIGO, TAMPERE, BARI, ETRIK, ESYCSA, OKAN, QUAD, TTS, VICOM, VTT, CEA*
T2.5	*POLIBA*	*POLIBA, 5T, AKKA, VIGO, TAMPERE, BARI, ETRIK,*

	ESYCSA, LINKS, ICCS, OKAN, QUAD, TTS, UBI, VICOM, VTT.

5.6.1 WP2 Gantt chart

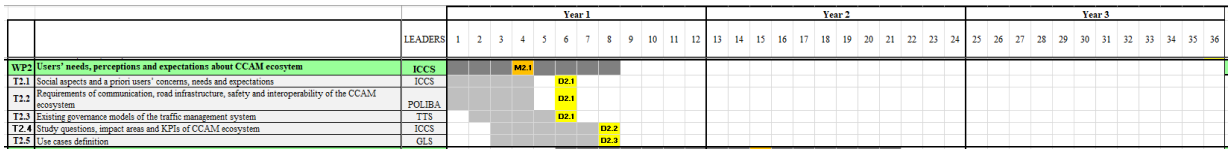

Figure 6: WP2 Gantt chart

5.6.2 WP2 Dependencies

Table 8: WP2 Dependencies

Input from:	Output to:

• No WPs
  • No Tasks
	• WP3
	• WP4
	• WP5
	  • T5.1
	  • T5.3
	• WP6
	  • T6.1
	  • T6.2

5.6.3 WP2 Related Deliverables and Milestones

Table 9: WP2 Related deliverables

No.	Deliverable Name	Due Date
D2.1	*D2.1 – Existing mobility needs, road infrastructure and governance models*	*M06*
D 2.2	*Study questions and KPIs of CCAM ecosystem*	*M08*
D 2.3	*Use cases definition*	*M08*

Table 10: WP2 Related milestones

No.	Milestone Name	Due Date	Means of verification
MS3	*Use cases completed and validated by the stakeholders groups per pilot site*	*M04*	*Use cases released and validated for each pilot site.*

6 WP3 ARCHITECTURAL AND TECHNICAL SPECIFICATIONS FOR CCAM SERVICES DEVELOPMENT, INTEGRATION, INTERMODAL INTERFACES AND INTEROPERABILITY

6.1 Task 3.1: Architecture and technical specifications of CCAM services and integration

This task will define the elements of the CCAM service architecture, which will be the reference for the LLs implementation in WP4. The architecture will take into account the use cases scenarios (including traffic management aspects and CCAM functions) and their requirements defined in WP2 and will be the basis for the technical developments to be carried out by the other tasks of WP3. The detailed architecture will facilitate a modular integration and information exchange, allowing acquisition of data produced by different legacy systems, harmonizing, and integrating them with new developed solutions. The design process will also include the definition of the interfaces and communication protocols that will guarantee the interoperability between different involved components. This will include interfaces with digital twin and training data base for artificial intelligence tools, developed through statistical information and through DT system. The design will take into account all relevant and key elements, like system requirements, risk factors, communication elements, safety issues, software and hardware, as well as, specific application requirements, with the aim of increasing the functional safety and performance of CCAM services while integrating them in the traffic management services. The following activities will be performed:

- develop an overall high-level architecture, covering all requirements defined in WP2, for the implementation of the UCs in all LLs.
- Develop a functional view of the CCAM services architecture, including the main functional components both at infrastructure and vehicle levels.
- Each LL will implement the high-level architecture considering own ITS platforms and requirements.
- Design of the interface for digital twin and artificial intelligence training data set.

6.2 Task 3.2: Development of optimized systems for the mobility of people and shared mobility services

This task will develop and integrate CCAM systems and services for people and shared mobility. Various existing, under-development and independent mobility services will be

integrated in a service palette as suggested in earlier tasks. The outcome will be scrutinised from various points of view, related to service provision, availability of the integrated mobility services, suitability of available CCAVs, as well as operational aspects. The target is to investigate and develop suitable means and tools to optimize the integrated mobility services in the LLs. The related activities are listed as follows:

- improving and enhancing data interchange V2V, V2I and V2P by ITS-G5, cellular and IoT, as specified in the LLs;
- development and integration of targeted mobility services based on requirements set out in WP2 by using AI, Machine Learning or Deep Reinforcement Learning (the simulation model from T3.5 can be used);
- integration and interoperability between the public transportation management platforms (via the remote control center) and the city's traffic management system in each LL;
- designing and enabling services for platooning, traffic light priority systems, services for VRU, on demand transportation for integrating CCAM on the basis of the identified requirements in WP2 (optimization strategies based on Machine Learning approaches will be used);
- designing and implementing the multimodal passenger services and their routing, connectivity and transfer points for integrated CCAV operations.

6.3 Task 3.3: Development of services for mobility network load balancing approaches through advanced traffic management guidance

This task will consider the T2.2 requirements in order to develop the services for network balancing. The related activities are listed as follows:

- ensuring the connectivity availability for (cyber)security and safety in communications;
- guarantying a feasible and sustainable road infrastructure coverage by enabling CCAM services also using data from external sources through V2X communication;
- design and implementation of AI algorithms and methods for load traffic balancing. The algorithms will be determined by using the simulation models (necessary for training the AI algorithms) developed in T3.5 or by applying DT approaches in the Tampere and Bari LL;
- developing and implementing the applications (APP) for VRU, localization of drivers, traffic flows balancing;
- definition and implementation of APIs and data exchange for V2V, V2I and V2P devoted to implement the load balancing in traffic management systems.

6.4 Task 3.4: Development of optimized services for goods management and delivery

This task will study and implement new efficient delivery services, including CAVs. In particular, new urban freight transport and last mile logistics will be proposed to reduce the circulation of vehicles especially in urban areas. The idea is to create several networked HUBs, which act not only as storage of goods, but also as points of shunting and distribution. Innovative strategies to localize the micro-HUBs, optimize loads, reduce empty miles, utilization of dynamic routing and on demand services will be proposed: the novel approaches will use not only tools based on classic optimization algorithms, but also AI tools, Intelligent Data processing and analysis. The services will be developed referring to the LL of Bari and experimented by the simulation and a digital twin. Moreover, forecasting models and algorithms will be integrated, in order to provide a vision of the future reduction of traffic and emission.

6.5 Task 3.5: Advanced simulation models and Digital Twin Network for CCAM ecosystem

This task will develop the methodology to create a computerised Digital Twin Network of the CCAM ecosystems and Pilot Site studies and provide the evaluation of their impacts through modelling of CCAM applications, as well as real traffic conditions using advanced simulation models and tools and real-world data. Within the scope of this task, simulation software used for different purposes such as SUMO, OmNET++, PTV Vissim, PTV Visum, IPG Truckmaker, dSPACE ASM, FLEXSim and Ubiwhere's Mobility Catalogue will be provided and integrated, using their relevant competencies connected to real-world data through a detailed traffic system on lane basis, such as that of HERE or TomTom to develop or enrich the Digital Twin Networks as realistic as possible for the CCAM ecosystem. In this way, it will be ensured that the necessary environment is created for the impact analysis to be carried out especially within the scope of WP5.

The following activities will be performed:

- LLs and traffic conditions on these sites will be modelled by simulation software suites;
- the drawbacks of the simulation software tools and engines will be determined;
- to eliminate these drawbacks, simulation software suites with different purposes will be able to communicate with each other and exchange data. For this reason, necessary Application Programming Interfaces (API) will be made available;
- real-world data will be fed into the models through detailed external systems to determine the parameters of the models developed leading to DT of the CCAM ecosystem;
- advanced simulation models and DT methodologies will be developed for optimization of the mobility of people and goods and to satisfy integration with existing urban / regional mobility environments.

6.6 WP3 Partners involved

Table 11: WP3 Partners involved

WP3Tasks	Lead partner	Participants
T3.1	*AKKA*	*POLIBA, 5T, ETRIK, ESYCSA, LINKS, ICCS, OKAN, LIST, GLS, UBI, VICOM, VTT*
T3.2	*VTT*	*POLIBA, AKKA, ETRIK, ESYCSA, ICCS, OKAN, LIST, GLS, VICOM*
T3.3	*GLS*	*POLIBA, ESYCSA, LINKS, ICCS, OKAN, VICOM*
T3.4	*POLIBA*	*ICCS, OKAN, LIST, GLS*
T3.5	*OKAN*	*POLIBA, LINKS, ICCS, LIST, GLS, UBI, VICOM, VTT*

6.6.1 WP3 Gantt chart

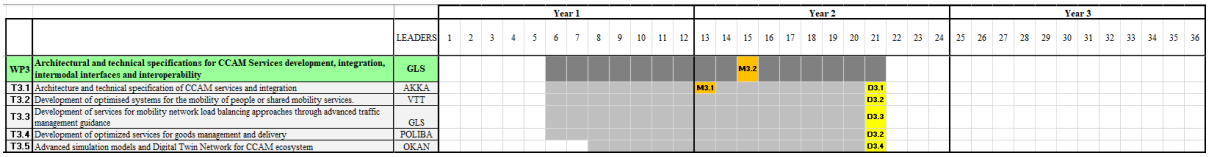

Figure 7: WP3 Gantt chart

6.6.2 WP3 Dependencies

Table 12: WP3 Dependencies

Input from:	Output to:
• WP2	• WP4 • WP5 • T5.1

6.6.3 WP3 Related Deliverables and Milestones

Table 13: WP3 Related Deliverables

No.	Deliverable Name	Due Date
D3.1	*CCAM services architecture description*	*M21*
D3.2	*Optimization of multimodal mobility services and goods management and delivery systems*	*M21*
D3.3	*Mobility network load balancing solutions*	*M21*

Table 14: WP3 Related Milestones

No.	Milestone Name	Due Date	Means of verification
MS4	*Verification activities and demonstration in each LL*	*M13*	*Architecture and specifications released and validated*
MS5	*A prototype of all systems, services and simulation tools for demontration*	*M15*	*Software released and validated in each pilot site*

7 WP4 DEMONSTRATIONS, COORDINATION AND IMPLEMENTATION

7.1 Task 4.1: Set up of the demonstrations, verification and integration of CCAM in the mobility system, in the public transport and in other shared mobility concepts

This task will set up, verify and integrate the existing infrastructure in each LL by the services developed in WP3. Onsite requirement for the demonstrations will be identified and set up and all activities will be undertaken to conduct any work, integrate and deploy the CCAM systems and services and involve all the required actors. Each LL will have the partner responsible to train and manage a network of local stakeholders, users and public authorities to conduct the demonstrations with the collaboration of the partners who will provide the CCAM services developed in WP3. A common framework will be provided, to describe the demonstration layouts and the verification steps necessary for an operational deployment in each pilot site. Therefore, this task will consist of three successive activities, to be applied to each LL:

- identify the onsite requirement for the demonstrations;
- identify the available CCAV fleets and its characteristics for each LL;
- set up and validate the simulation environments, scenarios and parameters that best represent the existing infrastructure and mobility;
- organize short-dry run tests to ensure that everything works according to the specifications, before the demonstrations start.

7.2 Task 4.2: Set up and validation of the follower living labs simulation

This task will focus on setting up realistic simulation environment for Follower LLs, on which the application of CCAM services is explored and validated in a digital way, using simulation and emulation solutions. Therefore, this task will consist of two main activities performed in each LL:

- set up and validate the simulation environments, scenarios and parameters that model the existing infrastructure and mobility in each Follower LL (real scenario);
- extrapolate the real, simulated scenario using additional data from the Follower LLs and the experience/models from the Lead LLs to reproduce the services described during the first activity (scaled-up, artificial scenario).

7.2.1 Subtask 4.2.1: Follower living lab in Bari (POLIBA)

The following use cases will be performed in the Follower LL in Bari: i) a route planner application to support users of different social groups to overcome acceptance barriers in the usage of autonomous vehicles, calculating and proposing different plans based on user profile and preferences and real-time availability of travel roads concerning real traffic conditions; ii) a new urban freight transport and last mile logistics to reduce the circulation of vehicles especially in urban areas, innovative strategies to localize the micro HUBs, optimize loads, reduce empty miles, utilization of dynamic routing and on demand services. The assessment of the UC will be performed by the simulation and DTN.

7.2.2 Subtask 4.2.2: Follower living lab in Quadrilatero (UBI)

Quadrilátero will cooperate with UBI by helping to integrate the existing ticketing and signage systems in the associated cities with the Ubiwhere Mobility Catalogue and also with the cities information panels. Quadrilátero will provide mobility data, supporting their integration into the Mobility Catalogue, which in turn will contribute to the simulation models and outcomes. It will also contribute with its expertise in traffic management strategies, involving the relevant stakeholder associations responsible for the shared mobility operations.

7.3 Task 4.3: Demonstrations on the field

The demonstrations will take place at an advanced stage of the project, in 4 cities: Trikala, Vigo, Tampere and Turin. Each demonstration will focus on common and complementary aspects, considering different contexts and issues, to address the integration of traffic (controlled TMC) and CCAM fleet (controlled ROC), to seamlessly govern and optimize mobility of people (and goods) transport and various last-mile services to balance the societal and individual user needs. Depending on the demonstrations, fleets with a different number of public and private CAV SAE level 3 or level 4 passenger cars and autonomous shuttles will be used in each city. In order to control, operate and manage the fleets, ROC and CCAVs are connected over a low latency and secure LTE->5G mobile network. The CCAVs are equipped with environment perception sensors, two-way safe and fast LTE/5G communication link with added security layer integrated. In addition, the CCAVs are equipped with both automated, remote and on-board driving equipment. The aim is to take into account a current traffic situation, public transport, user needs, societal aspects, traffic priorities, safety issues, CCAV characteristics, mobility service concepts to make CCAVs well integrated in the entire traffic management system.

Snapshots of the DT entity including traffic information, a simulation and analysis tool and a high definition 3D map are used to form a unique mixed traffic situation. The ROC simulator is built on Unity environment, using several high-power PCs and 4K UHD displays. The

duration of each demonstration can vary from city to city, depending on the set up and calibration needs of the CAVs, the environment in which they are made and the subsequent development of data collection/processing and execution of surveys.

7.3.1 Subtask 4.3.1: Demonstrations in Trikala (ETRIK, ICCS)

The demonstration will regard different services to be demonstrated as the route planner, the on-demand service integration of real-time traffic information to maximize service quality. In addition, the Mobility-as-a-Service (MaaS) platform will be integrated into existing systems. Remote monitoring and supervision system for safe and efficient operations will be demonstrated to monitor and control the autonomous vehicles, taking action if needed, to have real-time information and communication with the vehicle fleet, passengers and existing ICT services. The proposed services will be implemented with VRUs system for autonomous vehicles. Finally, via an end-user mobile application or an external request the vehicles will be ordered and it will be possible to display traffic information such as waiting times and expected arrival times. Moreover, the impacts of CCAM fleet on traffic via simulations (using biggest fleet, different scenarios that cannot be demonstrated in real environment) will be studied in order to scaling-up and assess the impact on traffic. The demonstration will be performed by 2 CAV SAE level 4 (mini vans of 6 seats) with 7 months for set up and calibration, at least 3 months of demonstrations and 3 months of conducting data collection/processing and execution of surveys as regards the LL.

7.3.2 Subtask 4.3.2 Demonstrations in Vigo (VIGO, ESYCSA, GLS, VICOM, AKKA)

The demonstration will analyse data and information interchanged among the CCAV fleets, traffic infrastructure and other users (connected or not) together with traffic management strategies on urban roads and which enable a smooth, safer and more efficient performance of CCA driving in coexistence with other users. For such purpose, a network of urban corridors with physical and digital features complemented with traffic management specific strategies will be defined. In particular, the defined strategies will act over the traffic light regulation in real time. The defined data sharing ecosystem will enable coordinate actions among fleets and infrastructure: traffic management strategy adapted to CCAM will provide priority or adaptive regulation in traffic light network to raise capacity of urban network through enabling a more efficient performance of CCAV fleets by:

- enabling traffic light priority on defined delivery time slots for authorized CAV;
- enabling complete platooning to pass with green light;
- reaction of connected automated vehicle to the presence of emergency vehicle approaching anticipated by traffic infrastructure.

Vigo as city authority, ESYCSA as traffic operator and GLS as key connectivity technology

provider will contribute with the needed adaptations traffic management infrastructure (physical and digital) and in C-ITS platform to enable the data interchange and the deployment of traffic strategies. VICOM and AKKA will provide the vehicle intelligence, which can provide to traffic infrastructure, the needed information and integrate the data received in decision making algorithms in CAV. The demonstration will be performed by 1 CAV SAE level 3-4 from VICOM and 1 CAV SAE level 3-4 from AKKA for 6/7 months of setup and 2 months for demonstration and data collection.

7.3.3 Subtask 4.3.3 Demonstrations in Tampere (TAMPERE, VTT)

The demonstration addresses the integration of traffic (controlled TMC) and CCAM fleet (controlled ROC) to seamlessly govern and optimize mobility of people (and goods) transport and various last-mile offering to balance the societal and individual user needs. In order to control, operate and manage a fleet of CCAVs, the ROC and CCAVs are connected over a low latency and secure LTE->5G mobile network. The CCAVs are equipped with environment perception sensors, two-way safe and fast LTE/5G communication link with added security layer integrated. In addition, the CCAVs are equipped with both automated, remote and on-board driving equipment. The aim is to take into account a current traffic situation, public transport, user needs, societal aspects, traffic priorities, safety issues, CCAV characteristics, mobility service concepts to make CCAVs well integrated in the entire traffic management system. Public and private CCAV fleet of SAE Level 4 consisting of five CCAVs and supported for simulation purposes by a simulated CCAV fleet. CCAV passenger cars and CCAV shuttles for executing robot taxi services and last-mile feeder services for the tram services. To form a unique mixed traffic situation, snapshot the DT entity including traffic information, a simulation and analysis tool and 3D high-definition map are used. The ROC simulator is built on Unity environment, using several high-power PCs and 4K UHD displays. The demonstration will be performed with 5 CCAV for a duration of 6-7 months for set up and calibration, 12 months for demonstration in the field.

7.3.4 Subtask 4.3.4 Demonstrations in Turin (TTS, 5T, LINKS)

The demonstration aims at testing and simulating the application of traffic management strategies supported by a CCAM ecosystem consisting of: - a Traffic Control Centre (TCC) monitoring the overall status of the urban traffic; - a road infrastructure able to provide in-vehicle information by means of V2I technologies, whether relying on shortrange (ITS-G5, C-V2X), wide-range communications (based on the mobile networks) or a mix of those; - a C-ITS-S collecting traffic information from the TCC sources (e. g. traffic sensors and cameras) as well as from the CCAM vehicles. The Turin Traffic Control Centre (TCC) will be integrated with functionalities to provide in-vehicle information using V2I technologies, both over short-range (ITS-G5, C-V2X, etc.) and mobile communications. Furthermore, CCAM vehicles can be used as additional information sources to improve the information reliability and allow

vehicles to optimize their navigation solutions from the perspective of safety and sustainability. Relevant TM strategies shall range from: issuing warnings about the presence of Urban Vehicle Access Restriction areas, allowing the CCAM vehicle to take decisions; suggesting optimised routes providing direct suggestion (e.g., parking availability). The demonstration will be performed by 1 SAE level 3 autonomous shuttle for at least 10 people transport circulating in real mixed traffic with 1 month of set up and 2 months of operation.

7.4 Task 4.4: Data collection monitoring and systems refinement

This task has two goals: first, the task will instantiate the data collection and processing methodology of Task 1.4 and will deliver the tools for collecting, storing and managing the data from the demonstrations and for calculating the KPIs. To this goal, the necessary data to compute the KPIs specified in detail in Task 2.4 will be collected. The main aim will be to ensure comparability and consistency of collected data across LLs. The task will process, integrate and analyse large and highly diverse data from various sources, including data from CCAVs, data from the ICT tools and the infrastructures. An appropriate database structure will be proposed and implemented. The data acquisition and transmission tools will collect and archive the data from the local demonstrations in the database. Data management will be done on two levels: distributed data management of site- specific data from the LLs and centralized data management and calculation of KPIs for the analysis. Second, this task will ensure a continuous support to the demonstrations, with respect to the services development. A back-office service will take charge of possible malfunctions and will solve them. This task will also collect suggestions for improving functionalities, features and refining the services, as needed.

7.5 WP4 Partners Involved

Table 15: WP4 Partners involved

Task WP4	Lead Partner	Participants
T4.1	*GLS*	*POLIBA, 5T, AKKA, VIGO, TAMPERE, BARI, ETRIK, ESYCSA, LINKS, ICCS, OKAN, LIST, QUAD, TTS, VICOM, VTT*
T4.2	*LIST*	*POLIBA, BARI, ESYCSA, OKAN, QUAD, UBI*
T4.3	*POLIBA*	*5T, ACASA, AKKA, VIGO, TAMPERE, ETRIK,*

		ESYCSA, LINKS, ICCS, GLS, TTS, VICOM, VTT
T4.4	*ESYCSA*	*POLIBA, 5T, VIGO, TAMPERE, BARI, ETRIK, LINKS, ICCS, GLS, QUAD, TTS, UBI, VICOM, VTT*

7.5.1 WP4 Gantt chart

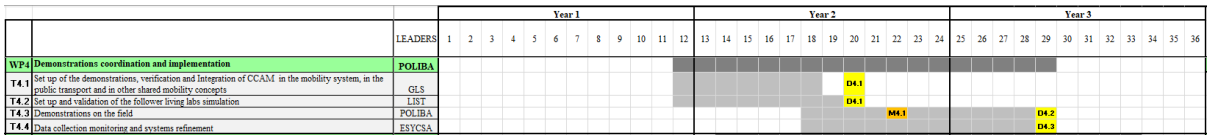

Figure 8: WP4 Gantt chart

7.5.2 WP4 Dependencies

Table 16: WP4 Dependencies

Input from:	Output to:
• WP2 • WP3	• WP5 • T5.4

7.5.3 WP4 Related Deliverables and Milestones

Table 17: WP4 Related Deliverables

No.	Deliverable Name	Due Date
D4.1	*Demonstrations' set-up and verification activities*	*M20*
D4.2	*Report on demonstrations activities*	*M29*
D4.3	*IN2CCAM data repository and system refinement*	*M29*

Table 18: WP4 Related Milestones

No.	Milestone Name	Due Date	Means of verification
MS6	Verification activities and demonstration in each LL	M22	Pilot site integration and deploy-ment verified and ready for demonstration

8 WP5 EVALUATION AND IMPACT ASSESSMENT

8.1 Task 5.1: Methodology for impact assessment

The aim of this task is to develop a methodology and framework to evaluate the impact of the CCAM solutions proposed by the project, either through real data in the Lead LLs or data from simulations for all LLs.

WP2's KPIs will be complemented with technical performance, operational and economic indicators. This task will perform the key following activities:

- define the data to be recorded for each KPI and the methodology to calculate the KPIs;
- define for each LL the data format and the necessary sample sizes to get significant results;
- select the simulators, tools, environments and methods for evaluating the KPIs.

Advanced simulation and DT models defined in Task 3.5 and Task 4.2 will be considered to avoid duplication of work - determine the weights and relative importance of the KPIs for evaluating the impacts in the CCAM ecosystem. The obtained weights will be used to:

- make a multicriteria analysis (e.g., the Analytic Hierarchy Process) with the object of the impact assessment;
- define online questionnaires, surveys and structured interviews to collect qualitative data for acceptance indicators to be done in Task 5.3.

The results of Task 5.1 will provide the objective evidence for guidance, policies and regulatory recommendations for CCAM services defined in WP6.

8.2 Task 5.2: Evaluation Data Collection and Processing

This task will serve as an input for Task 5.3 and Task 5.4 to provide real data from the LLs. For this purpose, the following activities are planned:

- translate the impact assessment methodology adopted in Task 5.1 into a set of concrete specifications for data collection to define the links, sampling frequency, but also the security and privacy aspects that may be involved at each test site in collaboration with Lead LLs;
- implement the data collection methodology and set up the necessary means to collect the data from the LLs (using servers with connectivity and sensors present on each LL);
- propose alternative solutions to complete any missing or uncollectible data (e.g., public datasets or emulated data as suggested in Task 5.4).

The analysis process will use data collected from all the LLs in WP4 by incorporating concurrently:

- quantitative methods to gather city transport data, data from the real trips done by passengers with IN2CCAM vehicles and data relevant to the usage of the related services and tools;
- qualitative social research methods based on and in cooperation with Task 2.4.

8.3 Task 5.3: A posteriori users' attitudes and social acceptance

This task aims to evaluate the social acceptance and social impact of the IN2CCAM innovations. Acceptance analysis and assessment process will be performed on a temporal continuum in three phases using Task 2.4's outcomes as input. The first phase is a priori acceptance (before the first use of the new vehicle and systems) on the basis of the results obtained in Task 2.1. A priori acceptance is the consequence of a comparison judgment between reality and its known alternatives, which generates a comparison between the achievements of reality and the possible benefits generated by the new technology. The other two phases are acceptance of the technology in situ (during first use) and actual appropriation (established use). The activities that will be performed to analyse social acceptance in all Lead LLs are the following:

- adapt or expand existing widely administered models of the literature, such as the Technology Acceptance Model and Unified Theory of Acceptance and Use of Technology;
- analyse the effect of specific factors/constructs, arising from the model that will be deployed, to social acceptance and intention to use. These factors include: socio-demographics (age, gender, education, employment, etc.) previous experience or knowledge, performance expectancy (usefulness), effort expectancy (ease-of-use), facilitating conditions, safety, service and vehicle characteristics and travel behaviour. The analysis will be done by surveys, semi-structured interviews, on-line questionnaires, feedback and satisfaction pods, structured/focused/standardized questionnaires in each LL. The impact of the LLs on the acceptance of the new solutions will be studied in relation with the specific KPIs defined within Task 2.4 and use cases of Task 2.5;
- generating a data pool, which can be used by the Follower LL simulations of WP4.

8.4 Task 5.4: Evaluation by simulation and Digital Twin models

This task aims to use simulation models, implemented in Task 3.5 and Task 4.2, to evaluate the different scenarios of the LLs under conditions that would not be possible to replicate in reality. Specific activities in this task include:

- development of a unified evaluation framework relying on a DT approach, composed of:
    - simulation scenarios and components from Task 3.5 and Task 4.1;
    - real data collected from trial sites through Task 5.2;
    - emulation solutions to overcome the lack of real data from the LLs. Open-source approaches will be privileged (e.g., SUMO, OMNET++);
- calibration of this simulation environment to simulate realistic traffic and network conditions (e.g., vehicle demand, consideration of different path loss models);
- feed the evaluation framework with data collected from the LLs (in real time, where possible – Task 5.2);
- scalability study to evaluate the impact of using more vehicles, under various constraints. This will be done by creating a city-sized simulation scenario to investigate the scalability of the project's technological solutions;
- consideration of communication network elements (wireless interfaces, infrastructure) and recommendations on the best deployment strategy;
- generation of recommendations to calibrate the experiments that may be done on future projects and use-cases.

8.5 Task 5.5: Traffic efficiency improvements evaluation

This task aims to evaluate the integration of the CCAM services with existing platforms and traffic control centers from LLs by determining the KPIs described in T2.4 and computed by the data collected in T4.4. Quantitative methods will be used to gather urban and peri urban transport data, data from the real trips done by people with IN2CCAM vehicles and data relevant to the usage of the related services and tools.

In particular, during the evaluation the following quantitative KPIs will be determined for each fixed time period: usage indicators (Galileo Satellite data, trip origin and destination, trip time and duration, distance, speed, acceleration), traffic efficiency indicators in different weather conditions, time and days of the week (queue lengths, throughput, waiting times at the traffic lights), traffic safety indicators (accident rate, accident risk by the three risk factors, i.e., hazard, vulnerability and exposure, accident severity), quality of service indicators, environmental indicators (CO2 emissions), economic indicators (time savings, cost of re-charging for electric vehicles, cost of parking). All these KPIs will be analysed by quantitative multicriteria methods in order to obtain an overall and high-level evaluation for traffic efficiency (for instance by AHP technique).

8.6 WP5 Partners involved

Table 19: WP5 Partners involved

Task WP5	Lead Partner	Participants
T5.1	*OKAN*	*POLIBA, VIGO, TAMPERE, ETRIK, ICCS, LIST, GLS, TTS, VTT, CEA*
T5.2	*LIST*	*POLIBA, 5T, VIGO, TAMPERE, ETRIK, OKAN, GLS, UBI, VICOM, VTT, CEA*
T5.3	*ICCS*	*POLIBA, VIGO, TAMPERE, BARI, ETRIK, ESYCSA, OKAN, QUAD, TTS, VTT, CEA*
T5.4	*LIST*	*POLIBA, VIGO, TAMPERE, ETRIK, LINKS, OKAN, UBI, VICOM*
T5.5	*POLIBA*	*ACASA, AKKA, VIGO, TAMPERE, BARI, ETRIK, ESYCSA, LINKS, ICCS, OKAN, LIST, QUAD*

8.6.1 WP5 Gantt chart

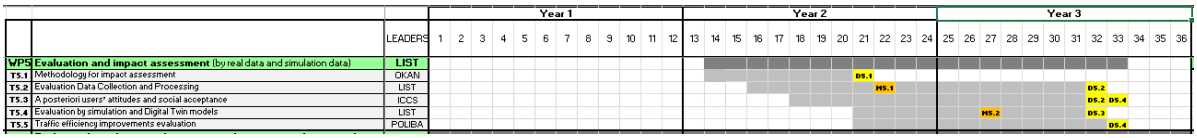

Figure 9: WP5 Gantt chart

8.6.2 WP5 Dependencies

Table 20: WP5 Dependencies

Input from:	Output to:

• WP2
• WP3
  • T3.5
• WP4
  • T4.2
	• WP6

8.6.3 WP5 Related Deliverables and Milestones

Table 21: WP5 Related Deliverables

No.	Deliverable Name	Due Date
D5.1	Impact assessment methodology	M21
D5.2	Data and impact assessment for user and social attitudes	M32
D5.3	Scalability study – Simulation and Digital Twin approaches	M32
D5.4	Impacts on mobility and traffic efficiency from the usage of CCAM vehicles	M33

Table 22: WP5 Related Milestones

No.	Milestone Name	Due Date	Means of verification
MS7	Data collection report ready	M27	The models for the DT are determined.
MS8	Digital Twin evaluation framework ready	M24	Initial business models are finalized.

9 WP6 EVIDENCE-BASED GUIDANCE, POLICIES AND REGULATORY RECOMMENDATIONS FOR CCAM SERVICES

9.1 Task 6.1: CCAM ecosystem building and involvement

This task will develop a dedicated public engagement strategy (D6.1) to define the project's local, national and European approach to involve project stakeholders. Drawing on the results of the needs analysis performed in Task 2.1, this task will also formulate evidence-based stakeholder-informed roadmaps to overcome barriers and concerns toward the scale up and replicability of the IN2CCAM's CCAM-driven traffic and fleet management solutions throughout Europe. To achieve this latter aim, input from LLs and local stakeholders, taking part to the project demonstration activities, will be needed; therefore, TTS will plan and co-organise targeted co-creation initiatives, such as four local ideas generation workshops in the Lead LLs to debate, exchange challenges and ideate solutions on a wide range of topics linked to scaling up and replicability of IN2CCAM (e.g., enhancement of the level of CCAM awareness and acceptance by end-users and concerned citizens, large-scale deployment and systemic uptake of the IN2CCAM solutions integrating CCAM and fleet/ traffic management). Task execution will also rely on iterative inputs by the IN2CCAM Community, a policy-oriented community that will include, among others, the Lead and Follower LLs of the project and, at least, 5 additional cities to be recruited for knowledge transfer, solution replicability and up-scaling. Informed by the outcomes of previously mentioned local workshops, such community will convene at least once a year (alongside project consortium meetings) to further stimulate debate between public and private-sector actors in several geographic regions (including those not directly addressed by the project). The IN2CCAM community will guarantee extensive transferability potential beyond the project and that the governance framework, business models and policy and regulatory recommendations (that will be formulated in WP6) fully reflect the needs, challenges and opportunities of the whole CCAM value chain.

9.2 Task 6.2: Co-design of multi-stakeholder governance model for CCAM services

The aim of this task is to co-design, together with the LLs, the governance models that will be used for an efficient and widespread adoption of solutions integrating CCAM and fleet and traffic management systems; by relying on the outcome of Task 2.3 and the lessons learnt from the demonstration activities in WP4, such models will be tailored to local conditions and the specific needs of the local stakeholder ecosystems. Several model typologies appear to be relevant for the governance of disruptive mobility services; whilst the model typology to

adopt will be selected via consultation with the LLs, these could be i) hierarchical governance model, a top-down approach “traditionally” used at National level, relying on binding rules or procurements; ii) market governance whereby policy instruments can be used to influence on economic variables (competition, pricing, taxes, subsidies) to achieve sustainable policy goals; iii) network governance, a relatively new mode of governance relying on collaboration between different stakeholders for the decision-making process; iv) self-governance whereby business or industry actors impose themselves rules in order to achieve policy objectives; v) knowledge governance based on the assumption that knowledge production and dissemination can be key influencers regarding the decisions that have to be done regarding policy developments.

City-specific discussions will occur to select the best approach, design and fully specify the selected models to local circumstances; moreover, future-proof governance scenarios - originating from the practical application of a specific governance model - will be co-created with stakeholders via a scenario building workshop to devise and describe the conditions through which the IN2CCAM solutions may efficiently and effectively operate beyond the project lifetime throughout Europe. The governance models and scenarios developed by the IN2CCAM’s WP6 team (specific to the IN2CCAM use cases) will be validated at an expert workshop (to be organized at the end of the project with European and International renowned cities and industry representatives), from which a set of practical actionable measures favouring the replicability conditions of the IN2CCAM innovation will also emerge.

9.3 Task 6.3: Co-design of CCAM business & operating models

The business and the operating models of CCAM will be co-designed. Initially, the business and operating models will be developed separately at M24, each model reflecting the CCAM services and use-cases proposed in the project. Further, in an iterative manner, the experience from operating CCAM services will be fed back into business model descriptions. The innovative CCAM-oriented business models will be guided by arbitrations in CCAM technology between the primary interests of Vulnerable Road Users, CAV users and the society as a whole. The traditional and modern fund-raising cycles (cycling seed rounds, crowd funding) will be presented in the context of advanced CCAM services such as fleet-oriented mobility. The paths from seed to profit, together with experiences of debt, sell-out and acquisition will be expressed for CCAM services. Novel contract-based business plans guaranteed by Non-Fungible Tokens will be considered as applied to contracts between actors of CCAM services. Deployment of CCAM services on a wide scale across European countries requires EU market homogenization, including opening of currently restricted markets, especially in the field of safety such as electronic traffic management. The steps towards this market opening will be considered as part of business models. Also, as part of business plans, tools of revenue generation include IPR assets. Licensing schemes between developers, manufacturers and distributors of CCAM technology will be considered. The operational

models of the CCAM services are strongly influenced by the specific CCAM regulatory framework and policies promoted at the different territorial scales, addressed within Task 6.4, with which this task will work. The impact of this operation on the business model will be analysed, in order to help designing effective business plans for CCAM well adapted to the local area. The operating models of CCAM services will be strongly impacted in the near future by the availability of disruptive technologies such as digital twins, the Metaverse and the development of post-5G and 6G technologies. The impact of these novel technologies will be accounted for in CCAM-oriented business and operating models.

9.4 Task 6.4: Regulatory and policy recommendations to Local Authorities

This task will focus on regulatory and policy approaches for the deployment of CCAM services in fleet and traffic management systems in urban and peri-urban areas. It will provide different regulatory and policy recommendations targeted at policy makers of interconnected scales: from local and national challenges to EU and international harmonization and other needs. To this aim, a set of multi-layered restrictions, gaps and opportunities for the establishment of regulatory and policy framework for IN2CCAM solutions will be identified and a concrete roadmap of actions, based on the outcomes and lessons learnt from the IN2CCAM demonstration outcomes in the Lead and Follower LLs, will be drawn up. Task 6.4 will establish working synergies with Task 6.2 and will also closely deals with the other WP6 tasks and Task 7.4, which focuses on exploitation strategy and on the identification of the technologies and solutions developed within the project. From a methodological standpoint, this task will be informed by the results from Task 6.1 (i.e., four local ideas generation workshop) and Task 6.2 (i.e., scenario building workshop) and will include an open consultation process, an online survey and two focus groups meetings (to be organized from M25 to M34), mainly targeting public and regional authorities that are linked to the IN2CCAM LLs, but also engaging other local and regional authorities beyond the project team, as well as the wider CIVITAS community, cities that are accommodating large-scale CCAV deployment pilots from other projects, such as SHOW, AVENUE and additional ongoing CCAM initiatives. The policy dimension will also include aspects from SUMPs development and monitoring of the multiple local authorities. Besides the LLs involved in the IN2CCAM, this consultation process will also address up to 20 cities (additional to the Consortium), by also leveraging the IN2CCAM Community set up as part of Task 2.1. It will be developed in coordination with WP7 partners ERTICO, TTS and ICCS and complemented by Trikala's leader experience in the Greek "Digital Cities" Group as well as the Central Union of Municipalities of Greece. Finally, an extended involvement of regulatory bodies will be pursued in this task (Regulatory and policy recommendations to Local Authorities), where an open consultation process, an online survey, and two focus groups meetings will be organized (from M25 to M34), mainly targeting public and regional authorities.

9.5 WP6 Partners involved

Table 23: WP6 Partners involved

WP6 Tasks	Lead partner	Participants
T6.1	*TTS*	*POLIBA, VIGO, TAMPERE, BARI, ETRIK, QUAD, CEA*
T6.2	*TTS*	*5T, VIGO, TAMPERE, BARI, ETRIK, GLS, QUAD*
T6.3	*CEA*	*AKKA, VIGO, TAMPERE, ETRIK, ERTICO, ESYCSA, OKAN, GLS, TTS*
T6.4	*ETRIK*	*POLIBA, VIGO, TAMPERE, BARI, ERTICO, OKAN, GLS, QUAD, TTS*

9.5.1 WP6 Gantt chart

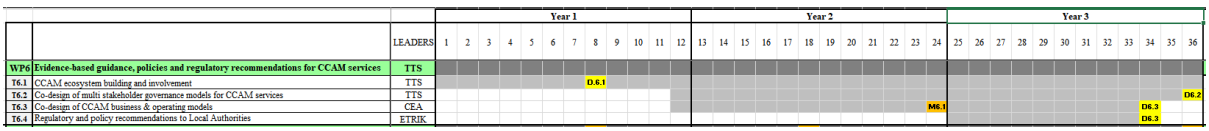

Figure 10: WP6 Gantt chart

9.5.2 WP6 Dependencies

Table 24: WP6 Dependencies

Input from:	Output to:

• WP2
  • T2.1
  • T2.3
• WP5	

9.5.3 WP6 Related Deliverables and Milestones

Table 25: WP6 Related Deliverables

No.	Deliverable Name	Due Date
D6.1	IN2CCAM public engagement strategy	M8
D6.2	Governance models and regulatory and policy recommendations for future-proof deployment of IN2CCAM innovations	M36
D6.3	Business and operating models	M34
D6.4	Regulatory and policy recommendations to Local Authorities	M34

Table 26: WP6 Related Milestones

No.	Milestone Name	Due Date	Means of verification
MS9	Initial business and operating models	M24	Initial business models are finalized

10 WP7 COMMUNICATION, AWARENESS, DISSEMINATION AND EXPLOITATION

10.1 Task 7.1: Communication, awareness and dissemination strategy and tools

The objective of Task 7.1 is to set an overarching communication and dissemination strategy and develop communication tools, in order to maximize the reach and impact of IN2CCAM's innovation and results in EU and beyond. The task will look at ensuring a coherent, wide and timely communication of the innovation, objectives, products and results of IN2CCAM project to the different stakeholder groups, including industry, public authorities, young generation, and, in general, to the public. The above tasks will be delivered through development of dedicated communication tools for IN2CCAM. Along with promoting the project's activities during the project, the aim will be to facilitate IN2CCAM's exploitation goals. This task will:

- develop a Communication and Dissemination plan in M4 that identifies target groups and describes the channels, the planned activities and materials to be developed throughout the project. The plan will also establish KPIs and list tools and procedures to monitor and measure performance;
- create an outstanding visual identity, including a logo, templates and guidelines, which communicate the innovative aspects of the IN2CCAM project;
- design and publish a project website to be used as the main information platform;
- establish a social media strategy and presence on existing networks (e.g., Twitter, LinkedIn);
- design and produce leaflets and other information/publicity materials, such as posters/banners, videos;
- contribute, upon invitation by the CINEA, to common information and dissemination activities, to increase the visibility and synergies between HE/H2020 supported actions.

10.2 Task 7.2: Dissemination activities about integration of services in CCAM

This task will have, as main objective, to seek for dissemination opportunities and publications in Scientific Journals and Peer-reviewed magazines, including journals and conferences in social sciences and humanities, as well as coordinating the presence at scientific events, with Papers and Session submission. The task will:

- ensure the production and publication of scientific and technical papers from the consortium in conference proceedings and top ranked peer-reviewed scientific and

technology journals;

- collaborate with relevant dissemination activities and events and seek opportunities for poster presentations, participation in webinars and technical workshops.

All key deliverables and especially the innovation and scientific results of the project will be guaranteed, when external contracts/limitations do not apply, through open access on the website. Finally, IN2CCAM will actively seek cooperation with international partners and projects, to promote the research carried out in IN2CCAM and foster international cooperation in the field of CCAM, leveraging international events such as IEEE, TRB, ITS congresses, etc. IN2CCAM will take care of:

- define and use cooperation agreements to exchange viewpoints and outcomes on CCAM in remote areas and on vulnerable and disadvantaged road users;
- develop liaison agreements with similar projects outside the EU.

Alignment workshops will be held every year at the ITS congress organised by ERTICO. Links have already been established with the following partners:

- Japan: Japan Advanced Institute of Science and technology, Prof. Nakyoung CHONG, Director of Intelligent Robotics Area, School of Information Science, Intelligent Robotics Area. Projects: A close project in distributed formation/ flocking control of a swarm of autonomous vehicles; Project on Transformable UAV UUV Hybrids.
- United States: Ohio State University, Center for Automotive Research, prof. Giorgio Rizzoni. Collaboration with the current project ARPA-E NEXTCAR: Integrate system-level energy optimization algorithms with L4-capable automation to obtain up to 30% energy efficiency improvement compared to base configuration of the vehicle (L0 automation). New Jersey Institute of Technology, Prof. MengChu Zhou, Director of Laboratory for Discrete Event Systems, Collaboration with the projects in Smart Logistics.
- Canada: Micro Engineering Tech. Inc. (METI) for a project working with V2X connectivity.

10.3 Task 7.3: Awareness events

Task 7.3 will ensure that the project results are presented to both internal and external stakeholders, with a specific focus on citizens at the test sites, but also in the localities of the project partners where and when possible. All associated partners in the CCAM ecosystem will be consulted to better impact the presentation of the project results. This task will be the main channel to raise awareness of the IN2CCAM project and its achievements throughout the duration of its activities. In particular, IN2CCAM will be disseminated and communicated to service providers and regulatory bodies, thanks to communication activities like the European and World ITS conferences, ERTICO's City Moonshot program and partnerships like CEDR, EuroCities and POLIS. The task will:

- organise presentations and sessions of the project activities and results in conferences, forums and other external events;

- coordinate and support technical workshops, demonstrations to the relevant stakeholders and presentation to relevant stakeholders from the partners' networks;
- organise a series of project events (launch event, final demonstration and events at selected pilot sites) to promote widely the project at different stages;
- organise a series of events, when and where possible in the localities of the project partners, to showcase the results of IN2CCAM and investigate possible replications.

10.4 Task 7.4: Citizens, user engagement and exploitation

Exploitation is the key to the sustainable success of the IN2CCAM project. The objective of this task is to provide the consortium with a framework to effectively exploit the knowledge, methodologies and solutions to be developed and tested, beyond the project lifetime. Exploitation is intended both as progress of the overall European research community and as commercialisation of new products, services and solutions. This task will first develop an exploitation strategy to define the framework and outline the required actions to drive market adoption and further utilisation of the project results. Moreover, the task will:

- analyse the market context and business environment, identify general market requirements and opportunities;
- identify the technologies and solutions developed within the project, assessing their expected impact and the factors that could influence or hinder their exploitation, including individual motivations and technology acceptance;
- identify key stakeholders, both public and private, to be taken into account or liaise with, defining their roles and potential benefits;
- identify a set of potential risks and blockers to be considered for adoption of the proposed solutions.

The aim is to identify the commercialisation potential of the project results, considering also European and global market trends. The market potential will be evaluated during the whole project duration. Two workshops will be organised throughout the project (at M16 & M30) to gather views from all the partners of the consortium and boost their commitment to actively drive both individual exploitation activities and participate in joint exploitation of project results. Appropriate management of the knowledge generated in the project and IPR protection, according to the partners' interests and level/way of involvement, will also be included. All these activities will lead to the definition of concrete Exploitation Plans that will include the necessary resources and actions required to exploit project results.

10.5 WP7 Partners involved

Table 27: WP7 Partners involved

WP7 Tasks	Lead partner	Participants
T7.1	*ERTICO*	*POLIBA, 5T, ACASA, TAMPERE, BARI, ETRIK, ICCS, QUAD, TTS, UBI, VTT*
T7.2	*POLIBA*	*5T, ACASA, AKKA, TAMPERE, BARI, ETRIK, ERTICO, ESYCSA, LINKS, ICCS, QUAD, TTS, UBI, VICOM*
T7.3	*LIST*	*POLIBA, ACASA, VIGO, ETRIK, ERTICO, ESYCSA, ICCS, OKAN, GLS, TTS, VTT*
T7.4	*TTS*	*POLIBA, ACASA, VIGO, TAMPERE, BARI, ETRIK, ERTICO, ESYCSA, ICCS, OKAN, LIST, QUAD, CEA*

10.5.1 WP7 Gantt chart

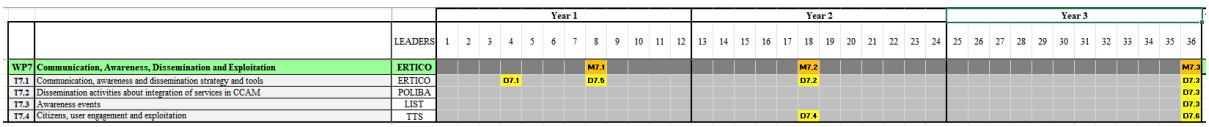

Figure 11: WP7 Gantt chart

10.5.2 WP7 Dependencies

In WP7 there are no dependencies with other WPs and Tasks.

10.5.3 WP7 Related Deliverables and Milestones

Table 28: WP7 Related Deliverables

No.	Deliverable Name	Due Date
D7.1	*Dissemination and Communication plan - First update*	*M04*
D7.2	*Dissemination and Communication plan - Second update*	*M18*
D7.3	*Dissemination and Communication Final report*	*M36*
D7.4	*Exploitation plans - First update*	*M18*
D7.5	*Liaison plan*	*M08*
D7.6	*Exploitation plans - Final report*	*M36*

Table 29: WP7 Related Milestones

No.	Milestone Name	Due Date	Means of verification
MS10	*Communication tools deployed*	*M08*	*Website & roll-out ready*
MS11	*Exploitation plan finalised*	*M18*	*Dissemination plan finalized*
MS12	*Dissemination, Communication and Final exploitation, Final Event*	*M36*	*Exploitation plan finalized*

11 CONCLUSION

This document represents the first version of the Project Management Plan, delivered in month 6 of the project.

This document intends to provide an in-depth analysis of the project management plan, including the structure of the work packages and related tasks, the role of each partner per activity, as well as the dependencies between tasks. The information reported are based on the IN2CCAM Grant Agreement, the Consortium Agreement and the discussions between the partners, made during the technical meetings, during the first 6 months of the project.

Initially, the work packages were briefly presented and synergies between them identified. Subsequently, each WP is described in detail, specifying the respective Tasks and objectives. Finally, the Sub-Tasks activities have been described, each of which is dedicated to serving a specific objective, defining a detailed time plan for the right project's progress.

In addition, dependencies between activities have been identified, making it easier to monitor the progress of work and identify the impact that any deviations will have on project activities. The role of each partner for activities and sub-activities was identified, facilitating the monitoring of the progresses and allowing timely monitoring of potential delays.

This document will be updated throughout the project's time plan, in order to keep track of all the activities carried out and the progresses and objectives achieved, in accordance with the time forecasts.

The next two versions of the Project Management Plan are scheduled for M18 and M36 and will incorporate a section reporting the progresses towards the project objectives.

ANNEX 1: LIST OF PARTICIPANTS TO IN2CCAM

- **POLIBA** - Politecnico di Bari, Italy **(COO)**;
- **5T** - 5T srl, Italy **(BEN)**;
- **ACASA** - Automobil Club Assistencia SA, Spain **(BEN)**;
- **AKKA** - AKKA Industry Consulting GmbH, Germany **(BEN)**;
- **VIGO** - Ayuntamiento de Vigo, Spain **(BEN)**;
- **BT** - Tampereen Kaupunkiseudun Elinkeinoja Kehitysyhtio Business Tampere OY, Finland **(BEN)**;
- **BARI** - Comune di Bari, Italy **(BEN)**;
- **E TRIKALA AE** - Anaptyxiaki Etaireia Dimou Trikkaion Anaptyxiaki Anonymi Etaireia Ota, Greece **(BEN)**;
- **ERTICO ITS EUR** - European Road Transport Telematics Implementation Coordination Organisation - Intelligent Transport Systems & Services Europe, Belgium **(BEN)**;
- **ESYCSA** - Equipos de Senalizacion y Control SA, Spain **(BEN)**;
- **LINKS** - Fondazione LINKS - Leading Innovation & Knowledge for Society, Italy **(BEN)**;
- **ICCS** - Institute of Communication and Computer Systems, Greece **(BEN)**;
- **OKAN** - Istanbul Okan Universitesi, Turkey **(BEN)**;
- **LIST** - Luxembourg Institute of Science and Technology, Luxembourg **(BEN)**;
- **GLS** - Neo Gls, France **(BEN)**;
- **QUADRILÁTERO** - Associacao de Municipios de Fins Especificos Quadrilátero Urbano, Portugal **(BEN)**;
- **TTS ITALIA** - TTS Italia, Italy **(BEN)**;
- **UBIWHERE** - Ubiwhere LDA, Portugal **(BEN)**;
- **VICOM** - Fundacion Centro de Tecnologias de Interaccion Visual y Comunicaciones Vicomtech, Spain **(BEN)**;
- **VTT** - Teknologian Tutkimuskeskus VTT OY, Finland **(BEN)**;
- **CEA** - Commissariat a l'Energie Atomique et aux Energies Alternatives, France **(BEN)**.