Advanced traffic management solutions for synchronized and resilient multimodal transport services

SYNCHROMODE

D1.2: Quality and risk management plan

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Date: 30/06/23

This project has received funding from the European Union's Horizon Europe research and innovation program under grant agreement No 10110471

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Executive Summary

The present document is the Quality and risk management plan, which is prepared within the context of WP1: Project Management of the SYNCHROMODE project.

The SYNCHROMODE project aims to develop a data driven ICT toolbox for improving the management of transport operations from a multimodal perspective, to manage the transport network. SYNCHROMODE will provide transport managers with new predictive and network optimization capabilities for balancing the transport supply and demand, enabling efficient reaction to different types of events. SYNCHROMODE will demonstrate via well-chosen case studies the effectiveness of integrated multimodal and multi-actor traffic and transport management solutions and the SYNCHROMODE toolbox, able to balance the demand load of both people and goods and at the same time reduce individual journey times.

Providing a high quality of research material is important for any research project. From that point of view, the SYNCHROMODE project aims to uphold a high quality for its produced Deliverables. For all the project Deliverables responsible for obtaining the content have been assigned, followed by a specific reviewing process that lays out the steps from a draft version, over internal peer review, towards a final review and submission by the Project Coordinator to the EC. Deliverable reviewers will focus on certain important quality aspects, such as quality (of the scientific content), formatting (of the typography), and language (spelling, grammar, and accessibility and legibility of the written text). Through the specific selection of reviewers, the peer review process ensures fair review conditions and efficient transfer of knowledge within the consortium. Moreover, specific mitigation measures have been set and will be followed in the case of any deviations and risks which may arise during the project execution.

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Summary sheet

Deliverable No.	1.2
Project Acronym	SYCHROMODE
Full Title	D1.2 – Quality and risk management plan
Grant Agreement No.	101104171
Responsible Author(s)	E. Mitsakis
Contributing Author(s)	A. Kotsi, D. Tzanis
Peer Review	Leire Serrano (DEUSTO) Antonio Masegosa (DEUSTO)
Date	30/06/2023
Status	Final
Dissemination level	Public
Version	1.0
Work Package No.	WP1
Work Package Title	Project management
Work Package Leader	ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS (CERTH)
Project Coordinator	ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS (CERTH)
Website	https://synchromode.eu

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Project partners

Organisation	Country	Abbreviation
ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS	Greece	CERTH
UNIVERSIDAD DE LA IGLESIA DE DEUSTO ENTIDAD RELIGIOSA	Spain	DEUSTO
NOMMON SOLUTIONS AND TECHNOLOGIES SL	Spain	NOMMON
YUNEX GMBH	Germany	YUNEX
MAP TRAFFIC MANAGEMENT BV	Netherlands	MAPTM
AIMSUN SLU	Spain	AIMSUN
BE-MOBILE	Belgium	BE-MOBILE
VMZ BERLIN N BETREIBERGESELLSCHAFT MBH	Germany	VMZ
ARRIVA PERSONENVERVOER NEDERLAND BV	Netherlands	ARRIVA
RUPPRECHT CONSULT-FORSCHUNG & BERATUNG GMBH	Germany	Rupprecht
POLIS NETWORK	Belgium	POLIS
PNO INNOVATION SL	Spain	PNO
REGION OF CENTRAL MACEDONIA	Greece	RCM
CITYLOGIN IBERICA SL	Spain	CITYLOGIN
PROVINCIE ZUID-HOLLAND	Netherlands	PZH
UNIVERSITY COLLEGE LONDON	United Kingdom	UCL

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Document history

Version	Date	Organisation	Main area of changes	Comments
Version 0.1	22.05.2023	CERTH-HIT	First version	Internal
Version 0.2	19.06.2023	CERTH-HIT	Internal review	To be reviewed
Version 1.0	30.06.2023	DEUSTO	Final version for submission	

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List of acronyms

CA	Consortium Agreement
EC	European Commission
KPI	Key Performance Indicator
MS	Milestone
PO	Project Outcome
QA	Quality Assurance
WP	Work Package

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1. Introduction

Concerning project management processes, the SYNCHROMODE WP1: Project management aims to ensure the successful execution of the project through effective and efficient management and coordination, towards the achievement of the project objectives. WP1 focuses on all management and administration related project activities, including the overall consortium and project coordination. The specific Task of WP1, which is related to this document is T1.4: Quality and risk management.

1.1. Purpose of the document

Task 1.4 has the objective to develop a detailed quality control and risk assessment strategy for the project. Activities in T1.4 will ensure that the defined plan is implemented and that all project activities will be consistent with the contractual obligations. For achieving this, T1.4 will highlight and tackle deviations in terms of results' quality (Deliverables and Milestones), timing and resources spent and will also early on identify shortcomings and their mitigation.

D1.2 presents the following areas:

- Quality management plan.
- Quality assurance plan.
- Quality control activities.
- Risk management and contingency plan.

The deliverable aims at ensuring an effective organization and execution that will allow the project to achieve its objectives. The management bodies must apply the Quality Assurance plan presented in this document that will ensure that the correct steps are applied to maintain a high level of quality. The final target of this document is to present the early-detected risks for the project and propose mitigation measures to be able to react timely and properly to them.

1.2. Intended audience

The dissemination level of D1.2 is public. This document is intended to be a guideline for the appropriate quality and risk management plan of the SYNCHROMODE project. This deliverable targets all projects' participants in the consortium in order to introduce them to the related procedures. Particularly, this document is important for tasks, work package and case study leaders due to their high relevance for deliverables execution and achievement of milestones.

1.3. Project Overview

This document is organized as follows:

- Chapter 1 present the Executive Summary of the present deliverable
- Chapter 2 present the Introduction of the present deliverable

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- Chapter 3 presents the Quality Management Plan, divided into 2 sub-sections which are Quality Assurance Plan and Quality Control Activities. The first one presents the Project Outcomes which will be used to monitor the project activities in terms of quality and targets achieved. The second one introduces the activities to be followed to ensure high-quality documentation from the project.
- Chapter 4 presents the detected risks for the project and proposes countermeasures to be applied if the risks become real during the project.

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2. Quality management plan

Quality assurance is essential for reaching the overall project targets. The main target is to monitor the achievements of the project, i.e., the deliverables and milestones, and to establish adequate processes within SYNCHROMODE to deliver high-quality results. The quality management for SYNCHROMODE is ISO 9001:2000 compliance. All the deliverables will be evaluated at least by two experts. Quality management is part of Task 1.4 activities.

2.1. Quality Assurance plan

The project implementation must be systematically reviewed to apply quality control standards. Therefore, a Quality Assurance (QA) methodology will be adopted for all project activities that should be carried out. This methodology is key for successful project management and monitoring. The QA plan will also cover the templates and requirements for internal documentation and deliverables, as well as an internal quality revision plan for them.

Basically, the QA methodology is used to make sure the Work Packages' objectives are fulfilled in terms of timing and quality following standards. The Project Outcomes (POs) set out in the DoA, are listed in the table below.

Table 1: SYNCHROMODE Project Outcomes

PO No	Description	Target (by the end of the project)
PO1.1	Advanced artificial intelligence and transport simulation models for an efficient door to door mobility combining different modes of transport and reducing oversupply/ overdemand.	• ≥ 6 different modes of transport • 15-20% reduction in oversupply/ overdemand
PO2.1	New and extended data standards including novel mobility demand data sources are used by transport management stakeholders.	• ≥ 15 transport management stakeholders
PO2.2	New methods for analysing multimodal network demand and identifying disruptions and bottlenecks are used by transport managers.	• ≥ 15 transport managers
PO3.1	Adoption of response plans in the light of disruption by the transport agents.	• 75% adoption by transport agents
PO4.1	Reduce traffic congestion by identifying traffic peaks in advance.	• 20% traffic congestion reduction

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PO No	Description	Target (by the end of the project)
PO4.2	Reduction of journey times.	• 15-20% journey times reduction
PO4.3	Decrease of empty kms travelled by vehicles (passenger, freight) in a 15-25%.	• 15-25% empty kms reduction
PO4.4	Decrease in polluting emissions generated by transport.	• 10-20% polluting emissions decrease
PO5.1	Acceptance of governance models by stakeholders	• 15 stakeholders
PO5.2	Involvement of policymakers	• ≥ 10 policymakers
PO6.1	SYNCHROMODE system is adopted in cities/ regions as supporting tool for transport & traffic operations management.	• 6 cities/ regions

The QA will make sure the POs are properly fulfilled within the project, ensuring the target is reached.

2.2. Quality Control activities

2.2.1. Deliverable preparation and submission procedure

Preparation and completion of Deliverables is a key indicator of project progress. The Deliverables preparation starts as soon as the task work begins, and progress must be periodically reported to Task and Work Package leaders that will report to the Project Coordinator.

All the deliverables in SYNCHROMODE must use the official template available created for the project. The Deliverables must pass through some steps before the final submission as presented in the table below.

Table 2: SYNCHROMODE Deliverables preparation and submission steps

Step No	Actions	Responsible	Due date
1	Preparation of Table of Contents to be shared with the partners that will be involved.	Lead partner	2 months

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Step No	Actions	Responsible	Due date
2	Write and coordinate the preparation of the deliverable.	Author(s) (coordinated by the lead partner and the involved partners)	Ongoing until submission deadline
3	Deliverable review by the responsible review partner (internal peer review).	Responsible review partner	2 weeks before the deadline
4	Check technical quality and consistency and fit into the Work Package	Work Package leader	1 week before the deadline
5	Final review and approval. Submission to European Commission	Project Coordinator	1 week before the deadline

2.2.2. List of Deliverables

The QA plan will be applied to the 41 Deliverables of SYNCHROMODE. The table below shows the complete list of deliverables and the respective reviewers.

Table 3: Detailed list of SYNCHROMODE Deliverables and reviewers after the Amendment (to be requested)

No	Name	Lead beneficiary	Reviewer	Type	Dissemination level
D1.1	Project & Innovation Management plan	CERTH	DEUSTO	Report	Public
D1.2	Quality and risk management plan	CERTH	DEUSTO	Report	Public
D7.1	Dissemination and Communication Strategy Plan (including dissemination material) - version 1	POLIS	CERTH	Report	Public
D1.3	Ethics requirement and monitoring plan	CERTH	DEUSTO	Report	Sensitive

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No	Name	Lead beneficiary	Reviewer	Type	Dissemination level
D1.4	Data Management Plan - version 1	CERTH	DEUSTO	Data Management Plan	Sensitive
D2.5	Case Studies description	NOMMON	YUNEX	Report	Public
D2.1	Report on user needs and system requirements definition for each case study	Rupprecht	VMZ	Report	Public
D4.1	Report on the relevant state of the art on Transport Management Modelling	UCL	CERTH	Report	Public
D5.1	Analysis of current and future mobility approaches in optimization of transport network management	DEUSTO	AIMSUN	Report	Public
D2.2	Multi-actor cooperation and governance models for integrated multimodal transport systems - version 1	Rupprecht	MAPTM	Report	Public
D3.1	Data requirements and inventory	NOMMON	BE-MOBILE	Report	Public
D4.2	Conceptual Architecture	UCL	CERTH	Report	Public
D6.1	Reference architecture and its applications - version 1	VMZ	DEUSTO	Report	Public
D5.2	Optimization models for transport network management	DEUSTO	UCL	Report	Sensitive

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No	Name	Lead beneficiary	Reviewer	Type	Dissemination level
D4.3	Transport Simulation report	AIMSUN	UCL	Report	Public
D1.5	Data Management Plan - updated version 2	CERTH	DEUSTO	Data Management Plan	Sensitive
D2.3	Multi-actor cooperation and governance models for integrated multimodal transport systems - updated version 2	Rupprecht	MAPTM	Report	Public
D3.2	API for data harmonisation and fusion - version 1	CERTH	NOMMON	Report	Sensitive
D7.2	Dissemination and Communication Strategy Plan (including dissemination material) updated - version 2	POLIS	CERTH	Websites, patent filings, videos, etc.	Public
D7.5	Report on networking, synergies and cooperation with relevant projects and initiatives - version 1	POLIS	VMZ	Report	Public
D3.4	Methodologies and Algorithms for mobility patterns reconstruction and identification of bottle necks and disruptions - version 1	NOMMON	UCL	Report	Sensitive
D4.5	Application of the transport state estimation models - version 1	AIMSUN	MAPTM	Other	Sensitive
D5.4	Transport network optimization module - version 1	DEUSTO	CERTH	Other	Sensitive

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No	Name	Lead beneficiary	Reviewer	Type	Dissemination level
D6.2	Reference architecture and its applications - final version 2	VMZ	UCL	Report	Public
D5.3	Optimization techniques for transport network management	DEUSTO	NOMMON	Report	Sensitive
D3.3	API for data harmonisation and fusion - final version 2	CERTH	AIMSUN	Report	Sensitive
D4.4	Operational hybrid models	UCL	VMZ	Other	Sensitive
D3.5	Methodologies and Algorithms for mobility patterns reconstruction and identification of bottle necks and disruptions - final version 2	NOMMON	UCL	Report	Sensitive
D4.6	Application of the transport state estimation models - final version 2	AIMSUN	CERTH	Other	Sensitive
D5.5	Transport network optimization module - final version 2	DEUSTO	CERTH	Other	Sensitive
D6.3	SYNCHROMODE toolbox functional specifications document - version 1	VMZ	YUNEX	Report	Sensitive
D6.5	SYNCHROMODE toolbox demonstrator - version 1	VMZ	CERTH	Demonstrator, pilot, prototype	Sensitive
D6.4	SYNCHROMODE toolbox functional specifications document - final version 2	VMZ	YUNEX	Report	Sensitive
D6.6	SYNCHROMODE toolbox demonstrator - final version 2	VMZ	DEUSTO	Demonstrator, pilot, prototype	Sensitive

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No	Name	Lead beneficiary	Reviewer	Type	Dissemination level
D1.6	Data Management Plan - final version 3	CERTH	MAPTM	Data Management Plan	Sensitive
D2.4	Multi-actor cooperation and governance models for integrated multimodal transport systems - final version 3	Rupprecht	DEUSTO	Report	Public
D6.7	Impact assessment results	CERTH	CERTH	Report	Public
D7.3	Dissemination and Communication Strategy Plan (including dissemination material) - final version 3	POLIS	CERTH	Websites, patent filings, videos, etc.	Public
D7.4	Exploitation & Business Modelling Plan	PNO	CERTH	Report	Sensitive
D7.6	Report on networking, synergies and cooperation with relevant projects and initiatives - final version 2	POLIS	POLIS	Report	Public
D7.7	Policy recommendations and lessons learnt	CERTH	DEUSTO	Report	Public

2.2.2.1. Deliverable template

Deliverables prepared within the project must follow a standard format. The templates will be available in Sharepoint and their use is mandatory by all partners in all Deliverables and documents. The Deliverable templates will contain a control sheet to be used as a change tracking system to maintain the quality standards.

2.2.3. List of Milestones

Milestones (MSs) are key for project management as they define temporal goals that guide the control of the project working pace. The list of milestones for SYNCHROMODE is presented in the table below.

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MS No	MS Name	WP No.	Leader	Means of verification
MS1	User needs and SYNCHROMODE system requirements defined based on a multi-stakeholder's approach. Initial stakeholder analysis finalized for the exploitation activities.	WP2, WP7	Rupprecht	D2.1., D7.4[1] (first release in M4)
MS2	System architecture defined; Case studies scope defined.	WP2, WP6	YUNEX	D2.3, D6.1
MS3	First release of API for data harmonisation and fusion ready. The market analysis is finalized and ready for use in the exploitation activities.	WP3, WP7	CERTH	D3.2, D7.2
MS4	First release of subsystems ready: Transport network optimization module. Application of the transport state estimation models. Methodologies and Algorithms for mobility patterns reconstruction and identification of bottlenecks and disruptions.	WP5, WP3, WP4	DEUSTO	D3.3, D4.5, D5.4
MS5	Final release of API for data harmonisation and fusion ready.	WP3	CERTH	D3.2
MS6	Final release of subsystems ready: API for data harmonization and fusion; travel behaviour models; transport prediction models; Optimization models for transport network management. First release of the SYNCHROMODE tool integrated.	WP5, WP3, WP4	DEUSTO	D3.3, D4.5, D5.4
MS7	Final release of the SYNCHROMODE tool integrated.	WP6	VMZ	D6.3
MS8	SYNCHROMODE tool tested and validated.	WP6	CERTH	D6.4

[1] According to the Grant Agreement, D7.2: Exploitation & Business Modelling Plan was used as a means of verification. However, the current version for verification is D7.4: Exploitation & Business Modelling Plan due to the versioning of D7.1: Dissemination and Communication Strategy Plan (including dissemination material)

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3. Risk and management contingency plan

For SYNCHROMODE it is of particular importance that potential risks are anticipated, clearly identified, and assessed, and that the project prepares for mitigation actions, if required, to ensure the commitment of the supporting partners and the joint efforts for deployment. All risks are assessed, updated, and reported on a regular basis by the partners both at Work Package and Case Study level. Risks are assessed by the Technical Management team, which draws up contingency plans.

This process involves a risk register, regularly reviewed by the Steering Committee, and submitted to the European Commission as part of the periodic reporting process. As a first step towards following the appropriate risk policy, the following table summarizes the critical risks identified during the proposal preparation, related to project implementation. Possible risk mitigation measures are also included.

The table presents the following information:

- Description of the risk.
- WP(s) involved.
- Proposed risk-mitigation measures.

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Risk No	Description	Work Package(s)	Mitigation measures
1	Partners' activities not aligned and not meeting project aims or outputs from one WP do not meet the requirements of the next WP.	WP5, WP2, WP3, WP1, WP6, WP4, WP7	Regular WP and technical meetings will be held to ensure that activities are streamlined and that lessons learnt are shared. WP achievements will be presented by each WP leader at the Steering Committee with the chance for feedback.
2	Delays on deliverables and results not meeting project objectives.	WP5, WP2, WP3, WP1, WP6, WP4, WP7	The Steering Committee and management structures have established mechanisms to react against possible delays. Regular meetings will be scheduled to ensure that activities are streamlined with the project work plan.
3	A partner leaves the project.	WP5, WP2, WP3, WP1, WP6, WP4, WP7	The rest of the consortium will try to assume the partner objectives, responsibilities, and resources. In case the responsibilities reallocation is not possible, the consortium will look for other partner with the same profile.
4	Partners do not agree on the IPR of the results of the project.	WP1, WP7	An exploitation plan will be developed within the first steps of the project, identifying the expected results of the project, as well as who will be the owner. In addition, a CA will be signed by all partners before the project starts, establishing the basic rules for IPR.
5	Low interest /engagement of local actors and stakeholders, restricting development of testing activities and	WP2, WP6, WP7	Design a promotional and engagement strategy for local outreach, based on the assessment of their priorities and needs to ensure mutual benefit and their interest in cooperating with the project. Identification of key target groups and local civil societies to engage with; define a clear methodology to select and reach out to a diverse and well-designed sample of users, exploiting local contacts of case

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Risk No	Description	Work Package(s)	Mitigation measures
	effective business & governance models.		study leading partners; provide incentives for participation of citizens in project activities; design promotional strategy for each case study. Exploit local networks from Case Study leading partners to target key stakeholders.
6	Insufficient data, and/or access restrictions.	WP3	The different partners involved in the Case Studies are aware of the data requirements and committed to share their data in frames of the project. Additionally, the Consortium has ensured access to a broad variety of data through agreements reached with transport authorities, public and private transport services providers, and other data providers (e.g., Nommon's agreement with Orange for the provision of anonymised mobile phone records). A first data analysis and mapping has been done at the proposal stage. Specific budget has been allocated for data purchase (e.g., commercial FCD).
7	Low data quality (e.g., noise data, Incompleteness of the data, etc.)	WP5, WP3, WP4	Definition of default or average values and application of data pre-processing techniques to enhance the quality of the data.
8	Excessive computational time required by the global	WP5	Simplification of the constraints considered in the optimization models according to their priority of fulfilment in each environment.
9	Interoperability of modules. Different components of the SYNCHROMODE toolbox	WP5, WP3, WP6, WP4	Using a well-structured requirement analysis, the Software modules will address the issues related to interoperability, by providing a precise definition of adapter interfaces related to standards within the project architecture.

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Risk No	Description	Work Package(s)	Mitigation measures
	are not compatible to each other, failing integration, putting pilots at risk.		
10	Collected data does not allow a coherent impact analysis.	WP2, WP6	Specifications of the monitoring and follow-up procedures must be carefully designed at the start of the use cases. Intermediate sampling will allow to confirm if data are sufficient.
11	SYNCHROMODE toolbox doesn´t reach the expected results.	WP6	During monitoring phase any negative deviation of the objectives will be analysed by the Steering Committee, supported by the case studies leaders and the partners involved.

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4. Conclusions

D1.2 Quality and risk management plan presents the Quality Assurance plan as well as the list of possible risks that can come across during the development of the project, including mitigation measures. The Quality Assurance plan is described to properly guide the partners and extract from them the best to achieve the project objectives in time and quality. The risks are presented to be able to apply countermeasures as soon as they appear.

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