



Holistic Approach for Providing Spatial & Transport Planning Tools and Evidence to Metropolitan and Regional Authorities to Lead a Sustainable Transition to a New Mobility Era

D9.1- The HARMONY area's orchestration, engagement plan and data collection guidelines

Submission date: 29.03.2021



[@HARMONY_H2020](https://twitter.com/HARMONY_H2020)

[#HARMONY-h2020](https://twitter.com/HARMONY-h2020)



[HARMONY-H2020](https://www.linkedin.com/company/harmony-h2020)



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 815269



Part of:



SUMMARY SHEET

PROJECT

Project Acronym:	HARMONY
Project Full Title:	Holistic Approach for Providing Spatial & Transport Planning Tools and Evidence to Metropolitan and Regional Authorities to Lead a Sustainable Transition to a New Mobility Era
Grant Agreement No.	815269 (H2020 – LC-MG-1-2-2018)
Project Coordinator:	University College London (UCL)
Website	www.HARMONY-h2020.eu
Starting date	June 2019
Duration	42 months

DELIVERABLE

Deliverable No. - Title	D9.1 - The HARMONY area's orchestration, engagement plan and data collection guidelines
Dissemination level:	Public
Deliverable type:	Report (public)
Work Package No. & Title:	WP9 - Validation areas: orchestration, engagement, and demonstrations
Deliverable Leader:	TNO
Responsible Author(s):	Nesterova N., Rooijen, T. van
Responsible Co-Author(s):	Leserri A., Yfantis L., Chaniotakis M., Quesada D., Rosinés F., Kamargianni M., Domański M., Estivo G., Klonaris G., Gorgogetas G., Tzivelou N., Raman S., Streng J., Tsouros I., Economides G.
Peer Review:	Rosinés F.
Quality Assurance Committee Review:	Kamargianni M., Chaniotakis M.
Submission Date:	14- 01-2020

DOCUMENT HISTORY

Version	Date	Released by	Nature of Change
0.1	23/09/19	TNO	Structure
0.2	15/12/2019	TNO	Version 1
0.3	06/01/2020	TNO	Version 2
0.4	15/01/2020	TNO	Final version

DISCLAIMER

The content of this deliverable reflects only the author's view and the Agency is not responsible for any use that may be made of the information it contains.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	4
Introduction	5
Aim of the project	5
Structure of the document	5
1. Orchestration approach for HARMONY co-creation labs	6
1.1. Setting up the co-creation lab	6
1.2. Operation of the co-creation lab	8
1.2.1 Operation of the physical demonstration	8
1.2.2 Operation of the other activities within co-creation labs	10
1.3. Evaluation of the co-creation lab	12
1.4. Knowledge exchange	14
2. Setting up HARMONY co-creation labs	17
2.1. Rotterdam co-creation lab	17
2.2. Oxfordshire co-creation lab	19
2.3. Trikala co-creation lab	22
2.4. Turin co-creation lab	25
2.5. Athens co-creation lab	26
2.6. GZM co-creation lab	28
3. Stakeholders engagement	30
3.1 Reach out strategies	30
3.2 Supporting materials	35
4. Conclusion	38
References	39
Annex A. Secondary data collection template	40
Annex B. Periodic progress evaluation template	49
Annex C. Scenarios for evaluation	50
Annex D. Template for round table	51
Annex E. Data privacy and protection issues	52
Annex F. Technical description of the vehicles	53

LIST OF TABLES

Table 1 KPIs for assessing measures to maximize impact	16
Table 2. Stakeholders to be engaged during HARMONY demonstrations	31
Table 3 HARMONY boards and their functions.....	34
Table 4 Supporting materials per channel of engagement activities	36

LIST OF FIGURES

Figure 1: HARMONY co-creation lab activities.....	10
Figure 2: HARMONY Data Collection Workflow	11
Figure 3. Oxfordshire test environment.....	20
Figure 4. Test environment of Trikala co-creation lab	23
Figure 5: Arrival van.	53

EXECUTIVE SUMMARY

Aligned with the Horizon 2020 Responsible Research and Innovation (RRI) approach, HARMONY envisages and works towards the formulation and operation of both metropolitan and cross-metropolitan co-creation labs. These labs comprise a multi-stakeholder network and a series of activities. The aim is to align HARMONY's research and outcomes with societal requirements and expectations as well as raise awareness.

Deliverable 9.1 describes a general guidelines for the setting up, operation, evaluation and knowledge exchange of six HARMONY co-creation labs. All of the co-creation labs contain a set of activities aiming to contribute to the further development of the innovative approaches to the mobility services on the local level, as well as to contribute to the HARMONY modelling activities. Next to it, three of the co-creation labs will carry out physical demonstrations of the drones or autonomous vehicles.

Introduction

Aim of the project

Nowadays, new mobility services and technologies present a possible solution to reduce greenhouse gas emissions and energy consumption in metropolitan areas. However, authorities face several challenges when it comes to harmoniously integrating these developments into spatial and transport plans to improve citizens' wellbeing and achieve environmental targets. Given rapid technological advances and the emergence of new mobility services, metropolitan authorities are often in need of expertise, knowledge and tools for multiscale spatial and transport planning.

Against this background, HARMONY's vision is to enable metropolitan area authorities to lead a sustainable transition to a low-carbon new mobility era. This will be guided by its harmonised spatial and multimodal transport planning tools, which comprehensively model the behavioural and operational dynamics of the changing transport sector as well as metropolitan areas' spatial organisation.

HARMONY has set ambitious targets for the co-creation of metropolitan scenarios informing updated spatial and transport planning tools. Therefore, a strict and stable planned coordination is mandatory to ensure the quality of the results and findings of each area and also to allow comparisons across the six different geographic areas. The consortium's intention is to ensure the best experience of the implementation of the HARMONY concept in each area and its exchange not only across the HARMONY metropolitan areas but also across other EU and international areas.

Purpose of the document

Within HARMONY, the WP 9 is responsible to make sure that demonstration activities are efficiently organized, contributing to the main goals of the project. Specific objectives of the WP 9 are:

- To develop the guidelines on setting up the co-creation labs, the stakeholder engagement activities, and the demonstrations to make sure that all the areas follow the same approaches and that can be comparable;
- To organise the aforementioned activities and demonstration and assist their operation;
- To organise cross-metropolitan activities for experience and knowledge exchange;
- To collect the secondary data, and recruit participants for the primary data collection. To evaluate the engagement activities, the demonstrations and the barriers faced in each area.

In this framework, task 9.1. specifically focuses on setting up HARMONY case studies and cross-metropolitan activities. It covers all preparatory steps, which are necessary to set-up and coordinate the demonstration as well as the stakeholders engagement activities, the primary and secondary data collections/surveys, the demonstrations and the evaluations of the case studies. A strict and stable planned coordination is necessary to ensure the quality of the results and findings of each area and also to allow comparisons across the six different geographic areas. Task 9.1 also manages the knowledge and experience exchange across the HARMONY metropolitan areas but also across the HARMONY areas and other EU and international areas.

Structure of the document

Deliverable 9.1 establishes HARMONY case studies orchestrating framework, describing all the steps that are necessary to set up, operate and evaluate co-creation labs and to organise knowledge and experience exchange. In order to achieve this, deliverable 9.1 has the following structure: Chapter 1 starts with an explanation the orchestrating approach applied to set up, operate and manage HARMONY co-creation labs. Next, Chapter 2, describes setting up phase for each of the co-creation lab. Finally, Chapter 3 describes stakeholder engagement approaches used in order to achieve and reinforce co-creation processes within HARMONY project. Chapter 4 is a conclusion, highlighting the next process steps. It is followed by the series of Annexes containing the evaluation templates.

1. Orchestration approach for HARMONY co-creation labs

In this chapter we describe the current state of the art of the HARMONY co-creation labs and identify what exactly have to be orchestrated there. Alongside modelling use cases, physical pilots with demonstrations will take place in Rotterdam, Oxfordshire and Trikala. Turin, Athens and GZM HARMONY co-creation labs will focus on stakeholder engagement activities necessary to fulfil their identified scope of activities. This chapter provides a short description of each co-creation lab for demonstration purposes, the activities and demonstrations to be carried out within them and indicates major stakeholders to be involved in co-creation process as well as indicative planning of activities

HARMONY aims to reach its ambitions on the level of each demonstrator-city by setting up and operating local co-creation labs and, thus, putting co-creation in the middle of its stakeholder engagement approach. Nowadays there is a growing acknowledgment that co-creation and end-user involvement are essential elements for the processes of innovation development and successful deployment. Co-creation as a method has been used in different domains for collaborative and creative work, where it brings together people from different backgrounds and expertise to achieve a final goal. It aims at creating an innovative product or solution that is mutually valued and accepted by all partners and, therefore, sustainable on the long-term (CITYLAB, 2019). This implies a cooperative process where all partners, and especially the end-user, can influence the experiments and, therefore, the final product/solution that is being shaped. Overall, the co-creation process is important for several reasons:

- It helps to align conflicting objectives and identify the common ambition in the process;
- It allows to gain valuable insights into all the facets of the solution you are developing;
- It aims to increase participation of the end-users in the development of the final solution and as a result increases the chances of the innovation adoption;
- It helps to raise awareness towards important issues within participating groups of stakeholders;
- It builds relationships between groups/individuals that exist well beyond the scope of a project.

Co-creation suggests the involvement of different groups of stakeholders in the demonstration process and implies activities that are designed to support creativity while shaping activities carried out within co-creation lab.

The orchestrating approach for setting up and operating the co-creation labs is organized in four phases and will be further detailed in the paragraphs below:

- Setting up of the co-creation;
- Operation of the co-creation lab;
- Evaluation of the activities and demonstrations carried up within co-creation lab, and
- Knowledge experience and exchange within co-creation lab.

Stakeholder engagement activities are organized throughout the whole co-creation lab, helping to achieve the objectives of each phase. Different stakeholder engagement strategies can be used at any stage of the process, making sure co-creation is really happening within the labs (Chapter 2).

1.1. Setting up the co-creation lab

The co-creation process begins with getting a clear understanding of the objectives and scope of the co-creation lab that is being created. Steps to set up a co-creation lab include:

- Define the co-creation lab objectives and scope;
- Create the core co-creation lab team;
- Select an appropriate co-creation lab governance model;
- Prepare the operation of the co-creation lab: identification of the potential demonstrations and activities to carry out in a lab an indicative planning.

The co-creation process begins with ***understanding of common ambitions of participating stakeholders***, identification of the need to set up a co creation lab and in framing what are the expected results of the work to be carried out within such a lab. Problem that is to be addressed as well as problem owners need to be identified. This all shapes a scope of the co-creation lab. Additionally the following aspects help to shape ***the scope*** of the co-creation lab:

- Area (which city area, the city center, building, neighborhood, etc);
- Main policy/city/neighborhood/project objectives related to the co-creation lab;
- Operational boundaries of the carried out activities;
- Users involved for execution of operations (including for example subcontractors);
- Users involved for planning of operations;
- Main customers, receivers and size of the addressed market;
- Other stakeholders to involve;
- Other relevant developments that help to scope the lab.

Next step in setting up a co-creation lab is ***definition of the core team***. The core co-creation lab team is a group of people/organizations that are interested to collaborate on the development of the co-creation lab. Within HARMONY project, the core co-creation lab team and ***governance model*** are pre-defined by the project framework. That means that HARMONY project participants are core team members and the governance model is the one identified by the project structure.

Understanding the drivers, interests, culture and the way of working of all parties related to the co-creation lab is important and helps with their continuous involvement and their commitment to the co-creation lab also beyond the project period. Once the core team is created, the roles and responsibilities within the lab can be identified (e.g. coordinator/manager, participant, user, customer). Depending on the specific question at hand stakeholders can have different roles within the same lab. Once the core team is created, it is also necessary to identify and analyse external parties types, which could help the lab to achieve its goals and which are not part of the core team. The above described steps should result in a clear understanding of each other's needs and goals, interests and commitment to the co-creation lab, enabling working together in setting up a co-creation lab.

After the core co-creation lab team is in place and its commitment to work on commonly agreed ambition and goals within the lab setup is formalised, ***the preparation for the operation of the co-creation lab*** can start. Initial preparatory steps include: identification of potential demonstrations and activities to develop and trial within a co-creation lab and indicative planning of the process. A co-creation workshop can have a good added value at this stage, aiming at collaborative participation of all the stakeholders. Objective of this workshop would be to find and create ways to address the co-creation lab needs through creative, knowledge sharing and constructive activities where the team is invited to negotiate and agree on the best solution that satisfy all stakeholders.

Once the preliminary ideas on are identified, team member need to further develop them within a co-creation lab. Thus, per each of them it is necessary to have a clarity on:

- Concrete objectives and ambitions;
- Expected result;
- External to co-creation lab stakeholders necessary to fulfil the demonstrations (who, why, what do we expect from them, their input and their benefit from the pilot);
- Planned co-creation strategies/sessions during the demonstration;
- Stakeholder engagement milestones (why, who, where, expected result);
- Demonstration location and test environment preparation (what is necessary to prepare there, who is involved, planning);
- Operational preparation for the demonstration (what is necessary, concrete actions, who is necessary for it);
- Potential risks, barriers and mitigation strategies;
- Potential facilitators;
- Baseline measurement (if any, based on the evaluation framework developed).

Analysis of the ecosystem defined by the above allows to identify early enough what are the potential risks and opportunities from the direct co-creation lab environment. It is also necessary to carry out the analysis of legal and ethical issues and mitigation measures that can be undertaken. It serves as a check whether the co-creation lab goals can be developed and achieved in real life without raising legislative, social, political or ethical issues.

The whole setting up phase is finalised with the development of the indicative planning for the co-creation lab. It should encompass both demonstrations carried out in the labs, as well as activities supporting them. This action plan should document key agreement points: objectives, scope, expected results to be achieved, operational and geographical scope of the lab, core co-creation lab team, concrete ideas for the demonstrations and activities to be carried out within the lab, risks and opportunities that were identified and which should be monitored throughout the whole lab process. The pre-selected demonstrations are documented via the process evaluation forms (Annex I) and the indicative planning of the co-creation lab is defined.

1.2. Operation of the co-creation lab

This section describes the steps necessary to operate the co-creation lab, advising some concrete steps to be performed. All HARMONY co-creation labs contain a set of activities that contribute to each individual co-creation lab objectives, as established in the setting up phase (e.g. the SUMP update, or estimation of impacts from the innovative mobility measures). Three of the co-creation labs, next to a specific set of activities are also running physical demonstrations: Rotterdam, Trikala and Oxfordshire. Therefore, this section is divided into two paragraphs describing specific approach to a) the operation of the physical demonstration and b) the operation of other activities of the co-creation lab. Stakeholder engagement processes are important in both cases and are at core to operation of any co-creation lab as well as an essential requirement for a successful co-creation process. Those are described in Chapter 3 of this deliverable.

1.2.1 Operation of the physical demonstration

Section 1.2 focuses on the operation of the physical demonstrations that are carried out within Rotterdam, Trikala and Oxfordshire. The goal of the operation phase is to deploy a co-creation demonstrations lab and perform its activities in the real life environment and gather actual results. At first, it contains all actual preparations, necessary to start real life operation of the physical demonstration. For example, permissions have to be arranged, equipment needs to be bought or leased, IT requirements have to be properly developed, potential technology has to be produced, requirements for interoperability and exchanging information platform among stakeholders need to be prepared, all administrative procedures are updated, licenses are arranged and, if necessary, the staff needs to be trained or even hired. Also, in the first implementation round of the co-creation lab, baseline measurements need to be done in order to be able to compare the results of the demonstrated solution with the before situation. The following steps are included in the preparation of the physical demonstration of the co-creation lab:

- Operational preparation of the physical demonstration;
- Preparation of the test environment;
- Preparation for issues and events;
- Co-creative workshops for the user instruction, kick-off and learning curve; and
- Baseline measurement.

HARMONY co-creation labs are dealing with physical demonstration of highly innovative solutions, including drones and autonomous vehicles. One of the unique expected results from the HARMONY project is the experiences and results from the real-life implementation of these technologies. Therefore, valid choice of and **preparation of the real-life test environments** are important milestones of the project. Prior to the physical demonstration, it is necessary to create an overview of typical situations that needs to be tested and whether it needs specific action to make sure that these situations will take place. All necessary admission procedures need to take place in order to allow testing of these technologies in the real-life situations.

Preparation for issues and events activity is carried out in order to estimate the overall risk analysis and develop mitigation measures for the physical demonstrations. Together with partners and stakeholders it needs to be decided which of the identified risks need to be mitigated, how, and when (if necessary) escalation protocols need to be drafted. These escalation protocols describe how to communicate and act in the case of issues, events and disruption.

As co-creation labs aim to co-create solutions together with an end-user, that is why that is necessary to include end-users in the preparation process from its beginning and maintain its active involvement throughout the process. Active involvement means treating the end-users and other participating stakeholders as designers of the demonstration and not only as interview subjects. It is therefore necessary to guarantee that stakeholders and users have the right expectations from the co-creation lab and its outcomes. The next necessary co-creation step is organisation of the **co-creative workshops for the user instruction** (where possible). During these workshops end users are informed on how their previous contribution have influenced the physical demonstration, what will happen during the real – time experiment how further the learning curve for this demonstration will look like.

Once everything is ready for the real-life operation of the demonstration, the solutions and technologies are tested in the real world and input for evaluation is gathered. Usually, a balance for the duration of the testing phase is to be preserved: to minimise the costs of the co-creation lab, the operation of the demonstration should be as short as possible; however, it should be long enough to obtain valid results for the evaluation and validation of the tested technology or solution. To evaluate the success of the demonstration and to be able to learn from it, it is important to understand the performance of the system before the demonstrations and measures were implemented. Measurement of the current status of the system is called a **baseline measurement** and these needs to be performed before the real-life implementation starts.

During the real-life implementation of the physical demonstration the following activities are taking place (CITYLAB, 2018):

- Management of the progress and scope (internal management);
- Management of stakeholder and user commitment (external management);
- Management of the environment (external management);
- Data collection.

Management of the progress and scope of the physical demonstration includes such regular project activities as: monitoring that the real-life implementation progresses according to the implementation plan; that right test situations are happening; right tests are performed; external influencers, such as risks and facilitators are well monitored, etc.

The **management of the stakeholder and user commitment** is one of the core components of the co-creation lab, compared to any other demonstration type activity. Stakeholder and user management commitment are dependent on their expectations, concerns, real-life implementation and approaches on how user feedback is included into the final design of the tested solution. For these reasons, it is important to keep communicating regularly about the progress of the physical demonstration and to share information openly.

Changes in the real-life environment can have a major impact on the process and results of the co-creation lab. Therefore, during the co-creation lab the **external environment** of the physical demonstration is continuously monitored (e.g. regulation, industry developments, stakeholder's ecosystem developments, etc) and any important changes are then fast incorporated into the implementation case.

Finally, within the operation phase of the co-creation lab **data collection** takes place. This data is necessary in order to perform evaluation of the physical demonstrator. More in detail the data collection processes for the physical demonstration as well as evaluation framework are presented in section 1.2.2 and section 1.3.

1.2.2 Operation of the other activities within co-creation labs

HARMONY co-creation labs have also activities that include primary and secondary data collection processes necessary for the HARMONY modelling activities. These data collection processes as well as stakeholder engagement are the main operation part for the other activities within the co-creation labs. Collaborative and multi-stakeholder engaging approach of the co-creation labs creates the need to efficiently acquire, analyse and utilize diverse information. These various data are going to be used for the investigation of future mobility services, technologies, policy and planning scenarios. They will also contribute towards developing the multi-scale and multi-dimensional simulation tool for spatial and transport planning (HARMONY MS). Therefore, the data collection process followed in HARMONY is not a trivial task. On the contrary, our approach needs to address the challenge of collecting high-quality quantitative and qualitative data for different tasks (conceptualization, modelling, development, etc.) which are inherently hierarchical and interdependent. As shown in Figure 1, several HARMONY co-creation lab activities include primary and secondary data collection via either workshops, focus groups and interviews or more sophisticated app-based tools and web-based surveys.

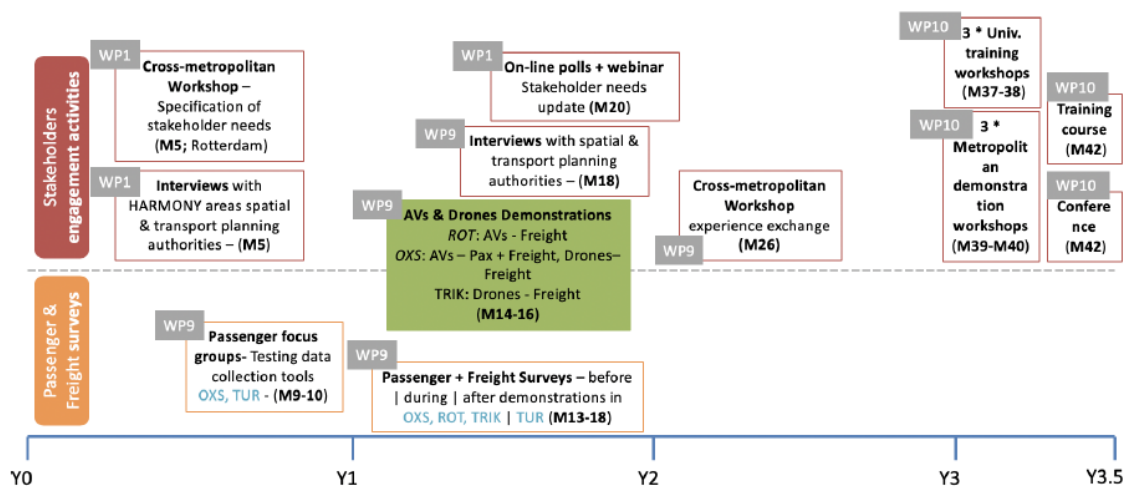


Figure 1: HARMONY co-creation lab activities

To handle the sequential and interdependent nature of data flows within the HARMONY tasks, a hierarchical workflow has been defined, in such a way that will satisfy HARMONY's main goals to:

- Develop a new integrated spatial and transport planning tool and,
- Adopt an agile co-creation approach where stakeholder and citizens' insights and requirements are at the focus point of any development effort.

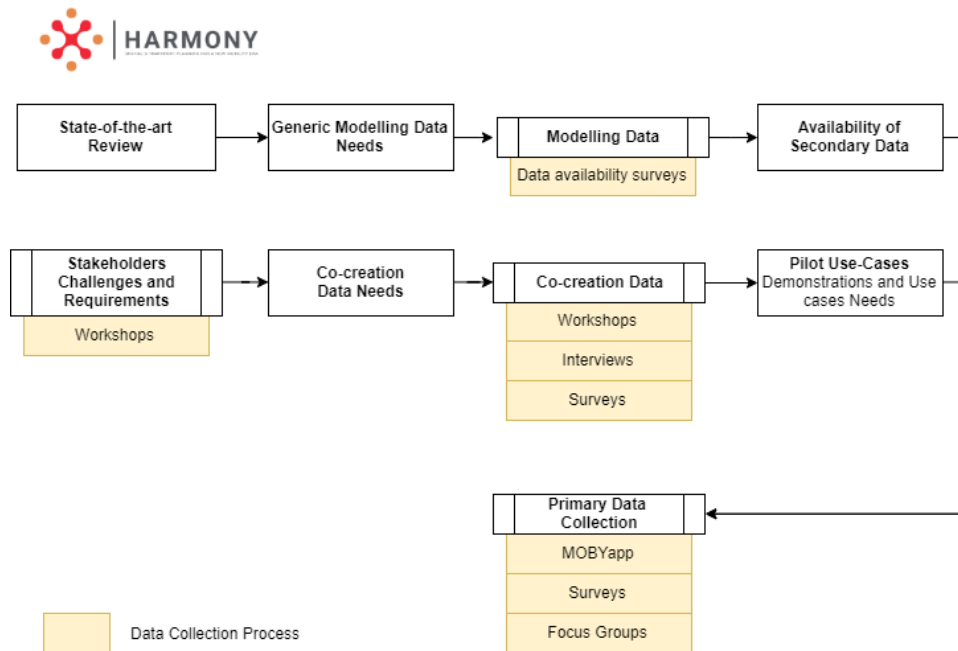


Figure 2: HARMONY Data Collection Workflow

As illustrated in Figure 2, the workflow consists of two concurrent series of activities which are required for and eventually lead to the definition of the HARMONY primary data requirements and the HARMONY MS development.

Determining Secondary Data Availability

HARMONY builds upon the state-of-the-art to extract data-related needs identified in similar research efforts. This has been based, on an elaborative state-of-the-art review presented in D1.1. To this end, the review identifies modelling requirements and the generic data requirements that enables integrated spatial and transport planning models. The availability of an undoubtedly large size and wide variety of secondary data required from these types of models is a requirement towards optimizing the quantity and quality of primary data collection. Therefore, secondary data availability surveys have been defined in the form of data templates. This work has been performed on the basis of models required for the various modelling levels incorporated in the HARMONY MS (strategic tactical and operational), by the corresponding members of the Scientific and Technical team. Where necessary, the interconnections and shared data needs have been identified and the templates have been restructured to best reflect the way that stakeholders usually handle data. To satisfy needs for up-to-date, usable and available data, aspects such as data formats, year of collection, data source, license and availability within the context of the project have been defined. The survey is generally based on guided open-ended questions that provide flexibility to the participant to list diverse datasets and in the same time illustrate the relevant data needs. The templates have been included in Appendix A.

Co-creation Related Data Collection

Basing our co-creation approach, data collection is essential to extract important qualitative information from relevant stakeholders or experts (e.g. policy makers, transport planners, regulators, public transport authorities, mobility and data service providers, freight operators, academics). The main aims are to extract their views and requirements on emerging mobility services and technologies, as well as future policies and their impact. Consolidation of experts' insights on these important aspects of the new mobility era enable the alignment of HARMONY's objectives, research and innovation activities with current experts' predictions for the future transport market, the public bodies' responses to those predictions, and the potential consideration of actions in their current strategy or research. Such a data collection process allows partners to further analyse stakeholders' responses and come up with HARMONY pilot-specific interviews and surveys. These will later on lead to a portfolio of future

scenarios/use cases and objectives, of interest to both stakeholders across Europe and HARMONY pilots.

This workflow is being currently followed: a cross-metropolitan workshop in Rotterdam took place in M6 of the project, where stakeholders from Europe have been invited to discuss on future mobility with AVs and UAVs. Important outputs from the workshop have been analysed and have been included in WP1 deliverables (e.g. D1.2: Stakeholder requirements and scenarios for regional spatial and transport planning). The analysis further allowed HARMONY partners to build on workshop's outputs and plan interviews and surveys with stakeholders from HARMONY's pilot cities towards extending their existing portfolio of future scenarios of interest and co-creating use-cases that they would like to evaluate and investigate.

Primary Data Collection

The findings from the above task streams and data collection methods feed the specification of the HARMONY pilot use-cases and, hence, primary data needs. More specifically, in the design and implementation phase of primary data collection tools, a set of innovative tools will be utilized in order to ease the burden from the respondents and participants, especially regarding primary data collection. Primary data collection will be streamlined via the use of the MOBYapp. The two main functions of the app are a) to host the questionnaires which collect quantitative and qualitative RP data about individual and household socio-economic characteristics, mobility tool ownership, attitudes and perceptions towards multimodality, traditional and new mobility services (three rounds of questionnaires will be designed for “before – during – after demonstrations” data collection for OXS and TRIK; one questionnaire for TUR – no demonstrations) and b) perform the main function of the app which is to collect location and travel data from the survey participants. Overall the primary data collection effort can be split into three categories: a) socio-demographic, attitudinal and travel behaviour data (RP); b) GPS location and travel data and c) a set of state-of-the-art SP experiments to capture individual's preferences for residential location, vehicle ownership, mode choice, and activity spatiotemporal changes given new mobility services and spatial policies. Additionally, the primary data collection includes before and after demonstration questionnaires to assess the impact of new mobility services and innovative technologies. More precisely data collection before and after the experiments/demonstrations in OXF, ROT and TRK (also in TUR, without experiment).

Finally, one of the most important aspects of the data collection process focuses on achieving a high-level of security and privacy for the data collection, handling and storing. T3.4 Data security & Privacy is a task exclusively dedicated to this goal. All necessary privacy enhancing principles and technologies for preserving the privacy of end users' and other stakeholders' sensitive data will be covered in this task. In order to prevent data misuse, this task will introduce corresponding security measures by a) securing the data transfer and b) ensuring the proper access control. Also, for more in-depth control over the collected and stored data, the HARMONY Access Policy Model will be employed, in order to closely monitor access to different types of collected and stored data by multiple actors.

1.3. Evaluation of the co-creation lab

The evaluation is a step necessary to draw conclusions on the experiences of the co-creation labs and its activities as well as lessons learnt from it. In task 9.8 of Harmony project evaluation of the validation area activities takes place. To enable a proper evaluation and comparison across the labs, it is necessary to establish concrete procedures and processes according to which the evaluation processes will be organized during the HARMONY duration. The character of activities performed within HARMONY co-creation labs suggests two types of evaluation processes. For each of the co-creation labs a process evaluation will be applied, that allows to reflect on the experiences of the co-creation lab and get the lessons learnt from their processes. Next to it, Rotterdam, Trikala and Oxfordshire will develop a set of KPIs in order to evaluate the results of the physical demonstration. Depending on the progress of the demonstrations, KPIs will be described in one of the deliverables on the HARMONY areas engagement activities and demonstrations (d. 9.3, 9.4 or 9.5). Evaluation of the co-creation lab includes three key steps:

- Development of the evaluation framework

- Data collection processes
- Data collection analysis.

The key objective of the Harmony task 9.8 will be to conduct evaluation of the six co-creation labs. Looking at the character of activities performed, within each co-creation lab, **evaluation framework** presented in this paragraph consists of two main pillars: (1) Periodical progress evaluation of the co-creation lab, and (2) Evaluation of the physical demonstrations.

Periodic progress evaluation (1) will be established for all the co-creation labs, in the form of the open questions form (Annex B), reflecting on:

- Progress on the objectives and expected results of the co-creation lab
- Activities carried out during the established period
- Barriers and facilitators encountered during this period
- Activities planned for the next progress report period.

Objectives and expected results from the co-creation labs, as well as concrete activities that are planned to be carried out in order to achieve those, are the starting point of the progress evaluation. At the end of the project it will be assessed, whether these objectives and results were achieved and what was the process, facilitating factors and barriers that led to it or not. Chapter 2 of the current deliverable sets up the objectives and expected results for each co-creation lab.

Evaluation of the physical demonstrations (2) will be performed according to the set of the co-creation performance indicators developed on the level of each individual demonstration. Indicators to evaluate the results of the physical demonstrations might include, for example:

- Performance indicators;
- Public acceptance and adoption indicators;
- Business model indicators,
- Technological readiness of solutions.

Performance indicators are quantifiable and clearly defined measurements, that reflect the core goals and targets of the intended demonstration. Those might include both indicators on operations as well as specific technical features of the demonstration.

Public acceptance (as well as, often, behavioural change) are essential for a solution to become successful. Performance indicators such as load factor, emissions and costs may show a significant improvement, however, in the end, it is public acceptance and adoption of the solutions by the end users that determines whether these improvements can be achieved and sustained for a longer time. It is therefore important to include behavioural elements in the evaluation which are than reflected in user feedback. When doing so, depending on the type of the physical demonstration, both adoption in a sense of buying and using the innovation should be considered.

Apart from the adoption and the performance indicators, influences on the business models of the key stakeholders can determine the success rate of the demonstration and more importantly the uptake of the results after the testing period. For this, data on costs, necessary investments, logistics and operational models before and after the technology adoption are assessed.

Data collection processes would differ in form and timing for either physical demonstration or other activities carried out within co-creation lab. For the overall co-creation lab activities, each 6 months the process evaluation form will be sent/collected from the HARMONY co-creation labs core partners. Regularity of the data collection from the physical demonstration will depend on the specific demonstration case and can take the form of interviews, on-site counting's, automated data collection, etc. It is also possible that physical demonstration evaluation might require baseline measurements data collection, in order to be able to compare business as usual situation with the situation after the introduction of the innovative solution.

Data analysis is performed throughout the co-creation lab in order to make sure that the lessons learnt from each evaluation period are well integrated into the future development of the lab.

For the physical demonstration specifically, the findings are assessed in order to compare the before and after situations. Based on the suggested evaluation framework, the following assessments are considered as useful to perform:

- Of the co-creation indicators to evaluate the efficiency of the solution / technology compared to the co-creation lab goals;
- Of the adoption indicators to evaluate users' feedback and public acceptance of the innovative solution / technology; and
- Of the business model and technological maturity of the solution / technology.

The assessment of the co-creation indicators compares the efficiency of the situation, before the solution was in place with the situation after implementing innovative technology or measure. When assessing the results, it is important to take outside influences into account, such as unexpected market developments or public reactions. In order to make sure co-creation process is on-going and commitment of the stakeholders is maintained, the results should be checked and interpreted together with the end-users. It is important to keep in mind that interpretation of some KPIs can be contradictory depending on different user. These situations need to be identified and clearly explained.

The assessment of the public acceptance, adoption and end-user perspective is qualitative in nature and could be performed with different stakeholders in a stakeholder session. Important output of such a session is to see if all stakeholders have reached the desired acceptance rate. If not, it is important to consider what are the main barriers for the acceptance and to consider if there are any activities that could alleviate these barriers.

The assessment of the business model and the technological readiness of the solution can best be performed by structurally going through all elements of the business model using, for instance, the business model canvas or other tools. The challenge in this process is to evaluate users' real experiences with the solution / technology developed. Usability evaluation is an important part of the process as it helps to determine which changes are necessary. Different evaluation methods can be used, varying from survey, behavior observations and other relevant methods.

The whole idea of the Living Lab is about involving the end user in the process as much as possible in order to increase possible adoption rate of the solution/technology. Discussion of the final evaluation results with major users, stakeholders and customers is therefore one of the most crucial steps in terms of the user-involvement process.

1.4. Knowledge exchange

Several activities and physical demonstrations are running in parallel within co-creation labs. Therefore the operation of the co-creation lab needs to consider how the knowledge from individual activities within individual co-creation lab is combined and transferred to other project co-creation labs as well as how the knowledge generated in the different co-creation labs will be exchanged beyond the HARMONY project. The main objective of the knowledge and experience exchange is to liaise with different stakeholder groups and to ensure interoperability of the project results with other innovative solutions in the field of sustainable transport and mobility. The knowledge and experience exchange activities are closely linked to WP10 Dissemination, Exploitation and Innovation Management, more specifically to T10.1 communication and dissemination activities and 10.3 Engagement activities and collaborations. Detailed and concrete approach to the envisaged knowledge exchange strategies and activities within HARMONY is therefore described in the corresponding to these tasks' deliverables. In summary, in relation to the knowledge exchange, HARMONY commits to:

- Avoiding duplication of work with other projects and platforms, especially within the CIVITAS network;
- Aligning with other activities in order to integrate HARMONY in the wider field of sustainable regional mobility and spatial and transport planning;
- Allowing others to build on HARMONY results.

T10.1 manages the dissemination of the project technical results and findings through presentations and demonstrations in conferences and other events. To this end, six training and dissemination workshops, a course and a conference will be organised for raising project awareness, presenting technical project advances, and training the new generation of spatial and transport planners. In addition, a number of HARMONY dedicated special sessions and other events will be organized in the framework of renown international events including the events of the CIVITAS family.

As for T10.3, it focuses on organising the wider stakeholder engagement and the collaboration activities of HARMONY:

- Collaboration with other initiatives and clustering;
- Liaison with related H2020 projects and other currently running and past European and national RDI projects is considered as a very important activity within this task. Strong cooperation links will be established with other EU and International Initiatives too so as to ensure knowledge exchange. In addition, the task manages the exchange activities with the CIVITAS network and, through playing an active role in the CIVITAS family, the contribution towards its objectives;
- Collaboration in joint workshops or other activities and events will be sought wherever possible;
- Support to the organisation of metropolitan and cross-metropolitan events;
- Organisation of the training course at the end of the project, aiming to teach the state-of-the-art regional spatial and transport planning methods, how to use the HARMONY MS, and how to translate the results to recommendations for updating SUMP and designing long-term strategies;
- Organisation of the HARMONY conference to communicate and disseminate the results to public authorities, industry and academia.

In order to be able to evaluate the efficiency of the knowledge exchange activities within task 9.8, the list the KPIs assessing the HARMONY measures to maximize impact can be used at the later stages of the projects (Table 1).

Channel	KPI	Method of measurement	Frequency	Threshold
Events	Number of conferences in which HARMONY will organize sessions	Report	By M42	≥ 4
	Number of events	Manually	By M42	≥ 40
	Number of audience contacts	Manually	On schedule	At least 60% of the participants
	Number of participants interested in HARMONY	Manually	On schedule	At least 50% of the participants
Website	Number of visitors/country	Google analytics	Monthly	≥ 100 different visitors
	Number of site access with duration less than 30 seconds		Daily	$\leq 20\%$ of total access
	Number of site visitors per month		Monthly	≥ 50
Newsletters	Number of newsletters	Report	By M42	≥ 7
Twitter	New followers per month	Twitter	Monthly	≥ 10
	Number of re-tweets per month		Monthly	≥ 20
LinkedIn (public)	New discussion per month	LinkedIn	By M42	≥ 2
	View of HARMONY profile		Monthly	≥ 20

Youtube	Number of stakeholders viewing videos about project	YouTube	By M42	≥ 300
Publications	Number of publications in scientific conferences	Report	By M42	≥ 16
	Number of publications in scientific journals			≥ 10
Thesis	Number of Master Dissertation	Report	By M42	≥ 5
	Number of PhD Thesis			≥ 2

Table 1 KPIs for assessing measures to maximize impact

2. Setting up HARMONY co-creation labs

This chapter corresponds to the setting up phase of the HARMONY co-creation labs. In line with section 1.1, for each of the co-creation lab it describes its objectives and scope, expected results from the co-creation labs, physical demonstrations and activities that would be performed in order to achieve established results. Next, it identifies the core co-creation lab team (HARMONY project partners) as well as additional stakeholders that were currently identified as necessary to fulfil co-creation lab activities. Where possible, ideas about co-creation strategies that will be used as well as planned stakeholder engagement moments are described. Plans for upcoming 6 months are outlined for each co-creation lab and where possible, put in perspective with the whole co-creation lab planning. Finally, some potential risks and possible facilitation factors are indicated.

2.1. Rotterdam co-creation lab

In order to investigate (and possibly promote) the integration of AVs into the local mobility system, the municipality of Rotterdam needs to have a clear picture of the potential effects and impacts from the AVs integration, e.g. in terms of the economic growth, jobs market, impact on the total vehicles within city borders, infrastructure and urban space requirements, impact on the IT and public communication systems capacity. The objective of the Rotterdam co-creation lab is to understand this potential impact of the AVs integration into the local mobility system. This will be done through the HARMONY modelling activities (simulation of the AVs effects and impacts) as well as physical pilots with AVs (at two locations: RADD Delft and in Rotterdam). There are two major expected results of the HARMONY Rotterdam co-creation lab:

- To develop a general understanding of how the local mobility system will experience the integration of the AVs and how new and traditional transport modes can operate together;
- To understand if the city of Rotterdam is ready for this logistics concept: acceptance and viability of the AV concept and next steps to be done for the adoption of the AVs within public space.

Next to the physical demonstrations, a set of activities, as described in HARMONY DoW, will be carried out in HARMONY co-creation lab:

- Engage and work with national and international stakeholders and citizens – co-creation labs (WP1, WP9);
- Integrate and demonstrate three electric AVs for freight testing the loading/unloading operations, its functioning in mixed traffic and possible use in unscheduled, shared service concepts (WP9);
- Collect primary data by conducting interviews with freight operators using serious gaming techniques to investigate acceptance for these new technologies (in various circumstances; i.e. B2B deliveries in the city centre, B2C deliveries to homes, trips between the depot and the distribution area to assess how freight travel patterns may change), and by using GPS devices to track traditional freight vehicles to compare with the AVs (WP9);
- Apply the freight strategic (WP4), freight demand (WP6), and freight multimodal controller simulators (WP7) of the MS and link existing land use and network models (WP4, WP7);
- Simulate the co-created scenarios to quantify their impact on spatial design, land-use, accessibility, energy consumption, noise and air quality (WP2);
- Recommend updates for the spatial and transport planning strategy and develop business cases.

The HARMONY Rotterdam core co-creation lab team consists of the City of Rotterdam, TNO, Arrival and TU Delft.

Three Level 4 electric autonomous vans (provided by ARR) will be used for the AV demonstration within the Rotterdam co-creation lab. Two pilots will be performed: in Delft and in Rotterdam. In Delft, the AVs will be first tested on partial performance at the Delft RADD (Researchlab Automated Driving Delft) test site, located about 15km from Rotterdam. 1 vehicle will be tested for 1 week. Tests will run for the situations without traffic, slow traffic, loading /unloading operations with various types of cargo. Testing will focus on the response of the AVs for the typical road situations, e.g. to cyclists (one or many), pedestrians.

In Rotterdam, the AVs will be integrated in the traditional fleet of the transport operator and tested at the public road. Two options are being considered for Rotterdam testing: 2 vehicles for 1 week or 1 vehicle for two weeks. For the public road part, it is still necessary to define concrete test location and to agree it with the National Road Authority. AVs will have a safety driving option. The vehicle(s) should preferably be parked at night in a closed depot with charging facilities. Some suggestions for the AV testing in Rotterdam, within the public space are:

- In the shopping centre delivering stores (e.g. a permanent shuttle round from a main delivery point. Shopkeepers can halt the vehicle when it passes their store and pick up and/or drop off their delivery item(s).)
- In a residential areas delivering parcels.
- As public road addition to the closed park shuttle circuit at Rivium handling freight for companies at Rivium and Consumers in Kralingseveer.
- At the TU Delft area doing the logistics for the faculties.

This demonstration is organised in order to:

- To check the acceptance of the AV by the external environment;
- To understand what are the infrastructural, data, and energy requirements, the communication requirements to enable deliveries with an AV and (un)loading with an AV;
- To understand what policies are necessary for all these elements to co-exist in a safe environment for the community;
- Overall, the AV pilot will be used to understand the challenges of combined logistics, traffic, deliveries, parking/drop off/pick-up areas in Rotterdam.

Within HARMONY, the pilot will provide data for the evaluation in WP9 (impact and process) and potentially the data from the pilot can serve as input to the HARMONY models (operational/tactical) to be applied/developed. TU Delft will identify which indicators will be collected in order to evaluate the pilot. Potentially, we could compare the delivery capacity to the regular process and investigate if a larger time window would be acceptable, thereby introducing more flexibility in the delivery of shops in the pedestrian area, where there normally is a time window from 6AM-10.30AM for delivery. The test driver could also record the reactions of the public to the vehicle; the TSP could evaluate the (in)efficiency of the cross-docking procedure, the receivers could be interviewed on their experience with delivery by AV.

For the stakeholders, pilot will provide new information on:

- What are the next steps in terms of the AV development and adoption: e.g. safety features development, necessary infrastructure and public space requirements for the AV adoption;
- Public acceptance of the AV;
- Required investments in the AV;
- Viability of the concept (including necessary practical arrangements).

The city of Rotterdam would like to further increase the investigation of the AV concept after the HARMONY pilot. This pilot will provide more clarity on which future extended tests to be realised.

Next to the co-creation lab partners, there are different types of stakeholders involved in the pilot:

- Authorities, cooperation with whom is necessary in order to get permission for the on-road pilot of AVs: RDW (Netherlands Vehicle Authority) and SWOV (safety authority);
- Transport operators, potential partners for the Rotterdam pilot: Breytner, UPS, Post.nl;
- Other knowledge platforms – Crow (official part of the RDW, having information on the road users), Future mobility network (knowledge exchange on smart and self-driving vehicles for city logistics).

More detailed demonstration planning indicates specific engagement moments planned with these key stakeholders:

2019 Q4: Engagement of pilot participants (transport service company and client(s)); Selection of test location(s) and test trajectory.

2020 Q1 : Start admission procedure with Netherlands Vehicle Authority (RDW).

2020 Q1: Test Arrival @ UK (outside project); 1 vehicle, 1 week.

2020 Q2: Scan of trajectory environment in Rotterdam with Arrival scan car

2020 Q3: Test Arrival @ RADD, Delft; 1 vehicle, 1 week

2020 Q3: Test Arrival @ Rotterdam; 2 vehicles, 1 week

A pilot on the public road with an AV is a quite ambitious activity. Main challenge is to get the approval of the RDW to enter the public road in Rotterdam. This year new law has entered into force, establishing a formal process to put the vehicle on the street for the trial. The whole admission process can take up to 6 months. Getting or not permission to test AV vehicle on the public road is a possible risk for this pilot.

Next potential risk consists in finding appropriate stakeholders (transport operators and clients) to run a pilot. Agreement with these stakeholders is also crucial for the definition of the test route, which is necessary for the formal RDW approval process.

There should be clarity on the technical possibilities and safety assessment of the AV vehicle for running in the inter-city environment. Necessary technical and safety adjustment can also potentially represent a certain delay for the pilot.

Several concrete steps are foreseen for the upcoming 6 months of the project:

- The city of Rotterdam and Arrival: engagement of pilot participants: the city will have consultations with some transport service company and client(s) in order to assess their interest and motivation in the pilot, if companies have already internal strategy for the automated vehicles or are just curious for the trial.
- All pilot partners: to select test location (origin – destination) and trajectory.
- Arrival: to further develop functionalities enabling AVs to drive on the inter-urban public roads.
- Arrival: to further continue with official approval process from RDW and City of Rotterdam
- TU Delft: to identify KPIs/measurements to be collected from the pilot, necessary for modeling activities and for the pilot evaluation.
- TU Delft: make all necessary arrangements for the RADD pilot.
- Arrival: the Type Approval & Safety Assessment process (meeting with RDW is planned).

2.2. Oxfordshire co-creation lab

HARMONY Oxfordshire co-creation lab will contribute into the demonstration of urban air mobility solutions in UK and will use HARMONY modelling activities to further contribute into the development of the regional spatial and transport planning strategies. The major expected results of the HARMONY co-creation lab are:

- To integrate HARMONY project recommendations on new urban air mobility technologies into the regional spatial and transport planning strategies;
- To carry out drone demonstration and evaluate feasibility and viability of this urban mobility solution;
- Possibly, to carry out autonomous vehicle demonstration and to evaluate feasibility and viability of this urban mobility solution.

There will be one physical demonstration carried out within HARMONY: drones demonstration. There also might be an opportunity to have an AV demonstration, however this demonstration will not be described in detail until it is fully confirmed. Other concrete activities to be carried out in the co-creation lab, as described in HARMONY DoW are:

- Engage and work with regional, national and international stakeholders and citizens– co-creation labs (WP1;WP9);
- Integrate and demonstrate electric AVs for passenger and freight and heavy-lift drones (WP9);

- Apply the air-traffic management controller for the drones (WP7);
- Collect primary data using the smart-phone based travel survey tool (including tracking) to investigate: i. how freight delivery travel patterns and couriers operations may change, ii. how passengers travel patterns and behaviour may change iii. social acceptance for these new modes, safety concerns, impact on accessibility and connectivity of the various cities within the county (WP9);
- Apply the strategic and passenger tactical and operational simulators of the MS (WP2,WP4,WP5) using the new collected and secondary data, and by updating and linking the existing traffic network models (WP7);
- Simulate the co-created scenarios to quantify the impact on land use, accessibility, energy, noise and air quality (WP2);
- Recommend updates for the regional spatial and transport planning strategy and develop business cases (WP8).

Core co-creation lab team are: Oxfordshire, OCC (Oxfordshire county council) and Innovation Hub.

Currently, Oxfordshire investigates opportunity of drones demonstration in the Milton park. Drones will than deliver freight packages within the inner area of this business park. As it is within an inner area of a business park, internal traffic on its roads can be controlled. 5 electric drones (20kg, 30kg and 100kg cargo load) can be provided by GRIFF for this demonstration. The choice on the concrete type of the freight company is not yet done. The demonstration will take place during the months of August and September 2020. It will be a single-day event, with the possibility of having a dry run a few weeks before. It must be noted that depending on the number of attendees to the main demonstration it will be decided whether the dry run will or not take place.

Milton Park is a 100 ha mixed-use business and technology park operated by MEPC plc. It is just south of the village of Milton, Oxfordshire, about 3 miles (4.8 km) west of Didcot. It's a place where collaboration and interaction are actively encouraged, and diverse ingredients come together to create a vibrant small town. It is home to more than 7,500 people and around 250 organisations, including various logistics companies such as DHL and UPS. It is privately owned and houses the Milton Park Innovation Centre, a flagship innovation centre for fast-growing science and technology businesses.



Figure 3. Oxfordshire test environment

There are two potential use-cases that have been discussed. The first involves flying a small drone carrying packages from the Park Centre to the Hotel, which would be 250 metres in distance. The second use-case involves flying a large drone carrying medical supplies from the Hospital to the Hotel, which would be 2000 metres in distance.

Expected results from the drones demonstration are:

- To verify feasibility of drones deliveries;
- To understand if there is a viable business model behind drones deliveries;

- To develop a framework to integrate Unmanned Air Traffic Management with Road Traffic Management;
- To identify critical use-cases that can provide future insights on usage of drones for medical emergency activities;
- To understand the process steps for the drones deliveries: its barriers, facilitators and deployment plan.

Several key stakeholders, next to the co-creation lab core team, are involved in this demonstration: GRIFF (UAV Provider & Operator), AIRBUS (Air Traffic Management operator), UCL (modelling and Data partner), OCC (highway authority) and Milton Park.

The venue of the UAV demonstrations will be at Milton Park, who will be able to liaise with interested organisations housed in the business park to take part in these trials. GRIFF will provide the UAVs (drones) required for the trials - a smaller drone for the transfer of medical equipment (e.g. defibrillator) and a larger drone for larger packages. AIRBUS will provide the air traffic management needed for planning the flight path and other communication requirements with the airspace. UCL will provide a framework for the expected datasets that need to be gathered as part of these demonstrations. OCC, as the highways authority, will co-ordinate with the Urban Traffic Management Centre to see how the Air Traffic Management can be integrated through the trials. They will also help setting up the application to the Civil Aviation Authority, which will be led by UCL.

The use-cases that have been defined as part of this UAV demonstration have been derived through meetings with stakeholders. The existing delivery of good/medical supplies that is being conducted through land vehicles will be baselined to determine benefits that UAVs provide.

The partner responsible for modelling will provide metrics to measure that will be used by the drone operator and air traffic management provider to determine parameters that need to be collected. These will also be used for baselining across other trials done around the world.

The overall planning of the drones' demonstration includes several stages. An airspace trial requires the CAA's approval before it can commence. This is the primary task that will be necessary for the demonstration. The trial sponsor will specify a defined objective by submitting to the CAA a Statement of Need, which provides a clear explanation of the following:

- What the trial involves;
- What the trial is aiming to investigate, prove or validate (i.e. a defined objective);
- Before and after descriptions, where relevant;
- What data and outcomes the trial sponsor needs in order to prove or otherwise that the trial has been a success;
- How the sponsor has considered and assessed the likely noise impact of its proposal and how this will inform the level of stakeholder engagement required;
- The confirmed start and end date.

The sponsor will then be required to complete a safety assessment that will be reviewed by the CAA.

Simultaneously, traffic management authorities will be brought together for a workshop to understand existing regulatory challenges and identify ways of integrating both road and air traffic management to provide a better framework for the future.

The drone operator and air traffic management provider will finalise the route path, along with landing zones and emergency landing spots on a geo-spatial system. This may include running of simulations to provide input on the actual corridors needed for the demonstration.

Engagement with all other stakeholders will be conducted by all relevant parties to ease the conducting of the trials. This entails:

- Community engagement regarding drone trials, noise levels, etc. ;
- Inviting participation from venue organisations;
- Providing modelling-related information to data collectors;
- Building of narrative to showcase the use of drones, applied use cases and potential benefits.

There are several risks that need to be considered in relation to the further development of the drones demonstration. First, there are the challenges due to drone characteristics: size, load capacity, storage, transport to trial location. There are also potential risks posed by route path of drone: travel over railway line; landing area clearance; road infrastructure; height of route and conflict with tree lines. Next type of risk is the feasibility of route path with respect to the following aspects: road traffic, surrounding environment and noise levels. Finally, one of the major risks is obtaining permission from Civil Aviation Authority to conduct airspace trials. Other potential barriers to the drones' demonstration: include public perception of drones; integration between road and air traffic management and strict enforcement of corridors.

In order to decrease the above-mentioned risks, the following mitigation strategies are considered:

- Stakeholder engagement with all relevant stakeholders and parties on the noise levels and road usage;
- Precise dissemination of information on the plan, goals and reasons for the UAV trials to all concerned parties;
- Identification of applied use-case that provides immediate value to public / transportation / stakeholders – e.g. medical emergency services;
- Mapping out all exigent situations and the multiple ways of tackling each scenario, e.g. emergency landing areas for drones;
- Facilitation of workshop to look at integration of all traffic management;
- Preparation of Safety Case for the entire demonstration.

In order to obtain the permission and clearance to conduct airspace trials, the facilitation provided by UK's Civil Aviation Authority (CAA) is critical. It is the statutory corporation which oversees and regulates all aspects of civil aviation in the United Kingdom. Additionally, National Air Traffic Services (NATS) may need to be contacted to facilitate the conducting of the trials. NATS provides safe and efficient air traffic services and innovative solutions to UK and international airports, airlines and governments.

The planning of the upcoming 6 months includes the activities that are to be conducted by the various partners:

1. Milton Park to discuss with Network Railway to verify feasibility of flying of drones over railway tracks.
2. Milton Park to identify potential organisations – Hotel, Hospital, Logistics organisations - who may be interested in taking part in the demonstration.
3. Oxfordshire County Council to set up a stakeholder workshop involving Road Traffic Management teams along with Air Traffic Management groups to decide integration approaches.
4. UCL to lead application regarding permissions for conduction of UAV trials to the Civil Aviation Authority. This will entail stakeholder engagement involving help from Milton Park and Oxfordshire County Council. The technical details and specifications required for the application will be provided by GRIFF and AIRBUS.
5. Conduct on-site meeting with all partners and the CAA to discuss route plan and other details
6. AIRBUS to plan simulation flight runs of the finalised use-cases.
7. GRIFF to test trial runs of drones in open field or other areas.

2.3. Trikala co-creation lab

Trikala is currently undertaking the preparation of the demonstration for the new mobility solutions in the urban-rural nexus, in order to overcome city's mobility challenges (e.g. congestion, car-oriented modal shift, etc). HARMONY Trikala co-creation lab will contribute into the demonstration of urban air mobility solutions and will use HARMONY modelling activities to further develop policy recommendations on the future development of new mobility technologies and their integration into the existing mobility system and into the SUMPs. The major expected results of the HARMONY co-creation lab are:

- To integrate HARMONY project recommendations on new mobility technologies into the regional SUMP. The SUMP will integrate ground and air mobility guidelines;
- To carry out drone demonstration and evaluate public acceptance of this air mobility solution.

In order to perform these activities, the drone demonstration in Trikala, connecting urban and rural areas, will take place. Next to it, Trikala co-creation lab will carry out a set of activities, as indicated in the HARMONY DoW:

- Engage stakeholders and citizens to investigate their requirements in terms of urban, suburban and rural mobility (WP1, WP9);
- Demonstrate drones for transferring medicines from the city centre to the surrounding areas and villages (WP9);
- Collect data to explore the impact on trips related to medical purposes to the centre social acceptance for new mobility technologies and services, and how passenger travel patterns may change by using paper-based questionnaires and personal interviews (WP9);
- Transfer results from the HARMONY MS application to assist the authority to deliver the SUMP for the area (WP8).

Core team of the Trikala co-creation lab is composed of: UAEGEAN, ICCS and city of Trikala.

A drone demonstration will take place between Trikala and surrounding villages (another drone will be used as a backup). Indicative demonstration duration is one week. Small parcels with medicaments will be transferred from the Trikala logistics centre to the villages, where a lot of elderly population lives. Logistics centre serves as a medicine's storage point for all the pharmacies in Trikala city. Currently medicines are delivered once a day per vans to the villages. The goal is to study the feasibility of the medicament's delivery to the villages with the drones and its public acceptance. Potentially drones would allow more frequent and on-demand deliveries of the medicaments as well as facilitate the delivery of the medicaments to the villages in the winter, when weather conditions are not always favourable to the road transport.



Figure 4. Test environment of Trikala co-creation lab

Exact location and number of villages participating will be determined based on the consultations with local stakeholders as well as based on the data collected by UEAGAN. In general, the average considered distance for the pilot from Trikala's centre to the village(s) is 4,5km.

Expected results from the drones demonstration are:

- To verify feasibility of drones' deliveries;
- To verify public acceptance for this innovative delivery mode;
- To initiate a business plan for the drones' deliveries in order to understand if there is a viable business model behind it;
- To assess multimodal connections between ground and air mobility;

- To understand the process steps for the drones' deliveries: its barriers, facilitators and deployment plan.

Next to the core co-creation lab team, several other stakeholders are important for the realization of the pilot. These are:

- City of Trikala and other public authorities (SUMP technical team, Ministries), for the necessary permissions and authorisations;
- Manufacturers: decision still should be taken whether the drones will be rented or bought (by UAGEAN). There is a chance that the drones than will need to be adjusted for the health sector needs (e.g. fragility, temperature control);
- Operators: knowledge exchange with other operators will be useful in order get their experience on, e.g. how to pilot things, how to pilot under bad weather conditions, what infrastructure preparation is necessary (sensors), drone tracing equipment, etc;
- Infrastructure providers: to understand infrastructure requirements for drones landing and taking off, such as monitoring cameras, fleet management systems, platforms for landing and take-off.
- Hellenic Civil Aviation Authority: to assist in the authorisation process;
- Association of pharmacists in Trikala, individual local pharmacists: to help shaping the pilot;
- Citizens of the city of Trikala: to check the public acceptance of the technology.
- Personnel trained for the operations with drones.

In order to better shape drones pilot several consultations with external to HARMONY stakeholders will need to take place as well as internal projects consultations. The stakeholders that are identified and are planned to be involved come from interlinking governance levels and scales, the local community, the regional, national and European level. Currently envisaged consultations are with:

- Internal HARMONY consultation in order to identify: how many villages we can serve with a pilot; what would be duration of the pilot; how many drones do we want to implement (one or two);
- Consultations with local mobility authorities, urban transport providers and users, elderly people, people with disabilities, pedestrians and cyclists in order to determine potential drone routes and to have an ex-ante assessment of this mobility solution acceptance;
- EEPA (association of civil aircraft authority) consultation in order to get advice on the drones legislation and which procedures are necessary to get permission for the pilot and its authorization;
- Consultation with the municipality of Trikala in order to see how the pilot corresponds to the measures developed within SUMP and to reach agreement on the drone pilot landing locations;
- Broader consultation with citizens in order to raise awareness about this innovative technology measure and to check ex ante public acceptance of the drone technology as well as public acceptance during the trial.

The baseline measurements will be identified later in the project. Different pilot aspects will be evaluated, including public acceptance of the process.

The planning of the next 6 months reporting period for the co-creation lab, includes the following activities concerning the drones' demonstration:

- Analysis and consultations with key stakeholders;
- Consultation with medical sector in order to receive the insights on possible input on regulation, compliance and security level for transferring medical supplies;
- To act on the recently launched Open Call for Pharmacists, where pharmacists were invited to express their interest into extending their freight transport modes through Urban Air Mobility services. 4 pharmacists applied for urban air mobility services declaring approximately 10.500 patients;
- Consultation with Association of pharmacists in Trikala so that a common safe solution is found;
- To identify proper infrastructure to conduct the pilot and secure its surrounding environment (e.g. discussion and first actions with Infrastructure providers on 5G network infrastructure;

HARMONY's technical partners need to identify the technical characteristics of drones to be used).

2.4. Turin co-creation lab

The City of Torino realized its SUMP in 2010. With the approval of a national law in 2017, the authority in charge of designing the new SUMP is no longer the City, but the Metropolitan City instead. The objective of the Turin co-creation lab is to study and model the effects of Mobility as a service (MaaS) large-scale development in the metropolitan area of Turin, with particular reference to the MaaS impact on the development lines of the Metropolitan Railway System (SFM) of the metropolitan area. This will be done with the help of stakeholder consultations and integration of the results from Harmony modelling and simulation activities into the regional planning strategies. The expected results of the Turin co-creation lab are:

- To assess public acceptance for new mobility technologies and services;
- To get a better understanding on the prospective dynamics of the passenger travel patterns;
- To have an update of existing traffic network model;
- A clear understanding of the MaaS effects and impacts on the land use, accessibility, energy consumption, noise and air quality;
- To contribute to the SUMP update.

HARMONY Turin co-creation lab core team includes CDT, AUCM and TRT. There are no physical demonstrations foreseen within this co-creation lab. In order to achieve the objectives and expected results from this lab, the following activities will be carried out by the co-creation lab core team, as specified in the DoW:

- Engage and work with stakeholders and citizens– co-creation labs (WP1,WP9);
- Collect primary data using the smartphone-based travel survey tool (including tracking) to investigate social acceptance for new mobility technologies and services, and how passenger travel patterns may change;
- Apply the strategic (WP4) and passenger-tactical and operational (WP5,WP7) HARMONY MS by using the new collected data and secondary data, and by updating and linking the existing traffic network model (WP7);
- Simulate the co-created scenarios to quantify their impact on land use, accessibility, energy consumption, noise and air quality (WP2);
- Support the med- and long term planning for Turin city and its surrounding areas and SUMP update (WP8).

In order to develop Mobility as a Service it is necessary to understand, which mobility services are already running in the metropolitan area: the first step is to retrieve the operating status information from existing stakeholders in order to achieve a first basic MaaS made of a multimedia travel planner. The following stakeholders will be consulted in the framework of this co-creation lab:

- Transport operators:
 - GTT, society running the public transport in Torino (Metro, trams, buses)
 - Extrato, a consortium of societies running bus public transport in the metropolitan area;
 - Trenitalia, national company running the Metropolitan Railway System, the regional, national and high speed railway services.
- Shared mobility stakeholders:
 - Car sharing: three operators, BLUTORINO, CAR2GO and Enjoy. In November 2020 a call for new operators will be published
 - Bike sharing: three operators, TOBIKE, MOBIKE and HELBTZ
 - Scooter sharing: MiMOTO
 - E-scooter: Helbitz, BIRD, CIRC, HIVE, DOTT, TIER
 - Car rental: LeasysCitizens
- Public authorities:
 - The Metropolitan City because it is the subject in charge of designing the new SUMP

- The Regional Mobility Agency who manages the financial resources of the regional public transport
 - 5T who handles the mobility data at regional level
- Infrastructure providers:
 - Airport of Torino
 - Metropolitan City
 - City of Torino

Next to it, the public consultations with citizens will take place in order to understand how to build a tailored MaaS offer (to be proposed within WP3 when the HARMONY app will be activated).

There are two main risks for the operation of the Turin co-creation lab. First, some mobility services might struggle to provide data, whether for technological reasons or internal policies. Second, as long as the MaaS paradigm won't be part of a programming tool (SUMP), it might be questioned by the political turnover of the administration. For this reasons, the political support of the administration is needed.

Concrete actions that will be undertaken within Turin co-creation lab in upcoming 6 months are the following:

- Development of the tailored approach to involve different groups of stakeholders;
- Creation of a hub for receiving data and investigating a cloud service where to store such data for extracting further information and for further analysis;
- Designing a questionnaire to understand at what level of MaaS every operator currently is.

2.5. Athens co-creation lab

Currently municipalities within greater Attika area are preparing Sustainable Urban mobility plans, containing different, targeted to the local situation, measures. Next year, a new transport plan for Attika will be finalised and the impact from the above mentioned measures should be assessed and evaluated within this plan. The objective of the Athens co-creation lab is to provide input into the metropolitan planning for the greater Athens area on strategic and tactical level by applying the HARMONY MS and to support impact assessment from the sustainable urban mobility solutions and new mobility services (e.g. AV in bus lines, cycling routes; last mile services, etc). This will be done with the help of the wide stakeholder consultation process and integration of the results from HARMONY modelling and simulation activities in to the regional spatial and transport planning strategies. The main expected results from the Athens co-creation lab are:

- To have an update of existing traffic network model;
- To get a clear understanding of the new sustainable mobility solutions available for local municipalities in Attika area;
- To perform impact assessment of these new services on the mobility system.
- To contribute to the regional spatial and transport planning strategies.

There are no physical demonstrations foreseen in this lab. In order to achieve the objectives of the co-creation lab as well as its results, there is a set of activities to be carried out in the co-creation lab, as specified in the HARMONY DoW:

- Engage and work with stakeholders and citizens-co-creation labs (WP1, WP9);
- Apply the Strategic (WP4) and the passenger-related Tactical (WP5) simulators of the MS and update and link the existing traffic network model (WP7);
- Simulate the co-created scenarios to quantify their impact (WP2);
- Recommend updates for the spatial and transport planning strategy and develop business cases.

OASA, UAEGEAN, ICCS are the core co-creation lab team members. In order to achieve the objectives and expected results from the co-creation lab, that will be necessary to engage with a number of key stakeholders. Therefore, the first step to set up the Athens co-creation labs is to identify the urban mobility stakeholders and understand their potential role and position in the process. This

procedure will help to identify possible conflicts and coalitions between stakeholders. Stakeholders can be classified into "primary" and "secondary", where primary stakeholders are those with a direct interest on the proposed mobility solutions, either because they depend on it or they are directly involved in its exploitation. Secondary stakeholders are those with an indirect interest.

Primary stakeholders are:

- Attica Transport Authority (Athens Urban Transport Organisation)
- Transport Operators (metro, bus, tram, suburban railway, Attika suburban buses)
- National Government institutions (Ministries of Transport, Energy, Spatial Planning etc)
- Traffic Police
- Mobility providers
- Local Authorities (Attika Regional Authority, Municipalities)
- Infrastructure providers (EV industries, EV charging stations etc.)
- Technology solution providers
- Direct users (passengers, citizens, people with disabilities etc.)
- Cycle/walking groups

Secondary stakeholders are:

- Local interest groups
- Environmental associations
- Business associations

The main scope of the stakeholder's engagement throughout the planning process is to address their specific requirements, identify their needs and points of view and define their preferences and key concerns. This will help to make the Athens Pilot acceptable and enhance its quality. It will also help to create relationships, trust, that will facilitate collaboration and ongoing communication among the parties. Co-creation labs will help to outline the objectives, expectations and problems of stakeholders.

Different types of mobility measures and solutions will be investigated during the HARMONY project. For example: Last mile service; on demand services; cycling routes; pedestrian routes; autonomous vehicles in bus lines; maybe a new metro line, MaaS, car sharing, etc.

Choice of stakeholders to engage into the consultations will depend a lot on the measure that we are addressing and can include different categories of pedestrians, cyclists, freight transport operators, infrastructure providers, urban planners, public authorities, people with disabilities, etc.

The following co-creation strategy is currently being envisaged: it is planned to have two workshops per type of the measures addressed. Objective of these workshops is to stimulate specific types of the mobility plans. First workshop can be seen as introduction where stakeholders get acquainted with HARMONY project and the pilot, collect initial stakeholders opinions, ideas around the measures, to identify the user requirements and what they would like to achieve at the end. Second workshop is then used to further co-create these scenarios with involved stakeholders.

For example, if the measure is to test the bus line with AVs, during the workshop testing route will be discussed, to incorporate opinion on the stakeholders where they want to implement this route.

Another example can be testing of the pedestrian routes. Then map can be created, and case studies presented to the stakeholders in order to understand suggested developments and incorporate stakeholders views on it.

There are a number of potential risks in Athens stakeholder engagement, including the following:

- The purpose and objectives of the engagement are not clear to stakeholders;
- Stakeholder expectations are not met or do not match engagement objectives;
- Possible conflicts between stakeholders (e.g., competition, rivalry and existing power structures). The history or previous relationships with stakeholders should be taken into account;
- Stakeholders do not have adequate time to participate;

- Stakeholders believe engagement activities are shallow;
- Stakeholders lack of capacities to contribute meaningfully in discussions;
- Stakeholders are not clear as to what their role is and the degree of influence they can exert.

However, the Athens co-creation core team member are potential facilitators of these process and have significant experience in stakeholder engagement. The main scope is to apply an engagement approach to meet the needs of participants, helping individuals to express their position and feel heard.

Concrete planning of the Athens co-creation lab for the next 6 months includes the following activities:

- An engagement strategy will be examined for the involvement of stakeholders, drawing on different formats and techniques when dealing with authorities, private businesses, civil society organisations, or all of them together. The engagement plan will incorporate a mix of appropriate techniques and tools to engage all stakeholders and maximise participation. Then, a feedback loop will be incorporated into the engagement activities in order to keep stakeholders informed of key project stages, activities and milestones. Evaluation of the strategy will be undertaken during and after the engagement process;
- The first workshop is planned to be held at the beginning of March 2020;
- A report with the findings of the 1st workshop will be produced in early April 2020;
- Details on mobility scenarios of the Athens pilot will be more clearly defined during the next period;
- The second workshop is planned to be held in October 2020. Detailed mobility plans will be presented and examined.

2.6. GZM co-creation lab

In three years GZM region needs to have SUMP produced, outlining the GZM agglomeration wider approach for mobility. This SUMP can be seen as a new masterplan for changing regional mobility scheme. For this, mobility patterns within agglomeration region need to be well investigated and solutions, incorporating the end-user views, need to be developed. The main objective of the HARMONY GZM co-creation lab is to have citizen-driven approach to the process of SUMP creation. Next to it, within GZM co-creation lab the opportunities of transport modelling software for the public transport network planning will be investigated. In line with this, expected results from the co-creation lab would be:

- Created SUMP reflects the needs of citizens in terms of the problems and challenges addressed and solutions proposed;
- There is a clear picture on the mobility patterns within and between different districts of the GZM agglomeration (urban, rural, intercity);
- Knowledge about transport modelling software and its potential application for GZM is produced;
- Transport modelling software is tested with input data from GZM and concrete user experience results are available;
- HARMONY MS is tested by GZM.

In order to achieve these results, there is no physical demonstration planned within GZM co-creation lab, but a set of concrete activities will be performed. These activities, as described in DoW are:

- To engage and work with stakeholders and citizens to investigate their requirements in terms of spatial and transport planning and new mobility services (WP1,WP9);
- To transfer results from the HARMONY MS application to assist the authority to plan for the metropolitan-wide transport, introduce new forms of mobility and update their SUMP (WP8).

The core co-creation lab partners are GZM region and ZTM (Zarząd Transportu Metropolitalnego) which is a GZM subsidiary, responsible for the organisation of the public transport in Metropolis GZM.

To achieve expected results, public consultations will be organised with different citizens groups, which represent the key stakeholder group for this co-creation lab. GZM agglomeration is a very large and heterogenous area. Therefore, as a first step, that would be necessary to investigate on what type of

districts it can be sub-divided. Then, different citizens groups, within these district areas will be invited for the public consultations about their mobility patterns, challenges and potential solutions. Per type of district, the following citizens groups might be approached: students, seniors, parents with children, etc. Different age groups with different mobility patterns should be included in the sample. At the later stage, businesses (e.g. supply chain companies, city logistics companies and professionals, e-commerce, etc) will also be taken into the process of public consultations. This is specifically to address home-work mobility patterns and potential impacts from teleworking. Finally, municipalities do also represent a stakeholder group, facilitating or not specific mobility solution.

Several steps co-creation and stakeholder engagement approach is currently foreseen within the GZM co-creation lab. The objective of the first co-creation workshop is to map mobility patterns of the selected stakeholder group, to “hear the daily mobility story” of each randomly selected group representative and to understand key drivers and challenges behind the choice of the specific mobility solution/mode choice. As a result of these series of workshops with different stakeholder groups, a clear overview of the mobility patterns within GZM agglomeration will be created and an overview of currently existing mobility bottlenecks will be made available. The next series of workshops will be focused on the co-creation of mobility solutions. End-users, together with necessary additionally stakeholders (transport companies, municipalities, consulting companies, urban planners, etc), will brainstorm about potential ways to overcome existing mobility barriers and facilitators that can further increase end-user adoption rates for the pre-defined solution-champions. Next, external consultancy will check financial sustainability and viability of these pre-defined solutions and will pre-select those that are recommended to be included in the SUMP. Finally, mobility schemes and solutions pre-selected for the SUMP will be presented and discussed to the participating stakeholders.

It would be beneficial to assure the participation of the same people in all of these workshops: therefore it would be necessary to see how commitment and interest of the participants can be maintained throughout the process.

Several risk factors can be foreseen for this co-creation lab approach. First, the low level of stakeholder participation can lead to insufficient input in order to develop SUMP reflecting citizens views and ideas. In order to mitigate this risk, it is currently planned to organise stakeholders meetings/workshops next to other events where these stakeholders are present (i.e. parents’ meetings in schools, senior clubs meeting etc.). Second risk is to have a biased stakeholders’ group with the same, as usual, people participating in the stakeholder consultations. Therefore, it is necessary to have a random group selection process, using an opportunity of another events (as described above). Third risk relates to the fact that GZM covers a huge area and time constraints would not allow to check the stakeholders’ samples from each district in the GZM cities. That’s why good area-types definition to take a sample is crucial for participation process. To do it well the co-creation lab team has to know demographics and topology of GZM Metropolis.

Next to it, there are several factors facilitating the GZM co-creation lab processes. That would be possible to use the assistance of NGOs that are fighting for better cities as a help in promotion of consultations. There is also an idea to use social psychologist as a facilitator during consultations – to get right thing from daily mobility story. Finally, the help of the municipalities in district types classification would increase the efficiency of the overall process.

During the upcoming 6 months, the following activities will be carried out within the co-creation lab:

- Q1 2020, SUMP public consultation approach will be tested on the small group of stakeholders. As a result, the final approach to the public consultation can be further developed and fine-tuned. For this, it will be necessary to: do the categorization and pre-selection of the districts; definition of the stakeholder groups per district to address; initiate stakeholder engagement process.
- Q1 and Q2, analyse the results of the consultation approach test, develop the final approach and initiate first SUMP public consultations.

The transport modelling software activity will be initiated later in HARMONY project.

3. Stakeholders engagement

This chapter describes the target and objective of HARMONY stakeholder engagement activities, as well as the tools supporting the stakeholder engagement strategy of the project. As already mentioned in Chapter 1, several elements regarding the evaluation of co-creation labs need to be measured through primary data collection, meaning the necessity of direct input from targeted stakeholders. HARMONY defines “stakeholder engagement” as the process involving targeted stakeholders as defined (D10.1/proposal) into HARMONY activities in order to elicit their input and feedback for the right development of the project solutions.

Therefore, stakeholder engagement represents a key factor determining the successful establishing and running of co-creation labs. It will also influence the design of the HARMONY Model Suite, scenarios and SUMP's update recommendations based on the received feedback. This process should be founded on the following principles:

- Inclusion: it needs to address the highest diversity of stakeholders;
- Variety of methods: it will resort to the most appropriate tool to engage different stakeholders;
- Reporting: it will investigate and document the feedback of stakeholders collected through different tools;
- Openness: it will publish objective information about stakeholders' requirements;
- Accountability: it will give feedback on the input received.

This task will be carried out in close cooperation with WP1 and WP10, especially with T1.3 and T10.3 respectively.

3.1 Reach out strategies

This sub-chapter will outline the HARMONY strategies for reaching out to targeted stakeholders. It is imperative that they are consistent across the six metropolitan areas, in order to allow the comparison of the findings. At the same time, they need to be tailored on specific stakeholders' profiles and on geographic areas' requirements in order to ensure the quality of the research outcomes. For example, HARMONY hosts three demonstrations with AVs and drones; each one having different concepts.

- In Rotterdam (ROT), electric AV vans are integrated into the traditional fleet of a courier to make city deliveries. The aim is to check how AVs can contribute to first- and last- mile delivery and their related infrastructural requirements in terms of roads, parking and EV charging, space sharing etc. This demonstration will involve multiple stakeholders; public and private organisations, construction companies, citizens and national and local bodies.
- In Oxfordshire (OXS), heavy-lifting drones are demonstrated carrying cargo from consolidation centres to shopping areas. This demonstration focuses on the citizens' needs, public and private bodies as well as stakeholders along the supply chain.
- In Trikala (TRIK), drones are demonstrated to carry medicines from the city to villages, where the majority of the population is elder and technology illiterate. This demonstration involves stakeholders from the medical field, public and private bodies, rural citizens, national and local bodies, innovation companies.

Table 2 below provides a visual summary of the type of stakeholders to be engaged in the metropolitan areas where HARMONY will host the demonstrations.

Table 2. Stakeholders to be engaged during HARMONY demonstrations

Type of stakeholder	Rotterdam	Oxfordshire	Trikala
Public bodies	x	x	x
Citizens	x	x	x
Construction companies	x		
Supply chain companies	x	x	
Medical experts			x

Scenarios for evaluation

The first step in the stakeholder engagement process is the identification of the different scenarios or topics to be evaluated. This is a key step affecting both the kind of stakeholder potentially interested in joining the conversation, the channel to foster discussion and the tools supporting the overall strategy. Annex C provides a detailed list of scenarios for AVs and UAM implementation coupled with their description. After the identification of all the important topics, each of them will be elaborated by Task 10.3 together with the leaders of the related tasks in order to define:

- The kind of the required input (e.g. technical feedback, answer to questionnaire, round table discussion etc.);
- A key list of stakeholders across the entire stakeholder spectrum;
- The timeline of the interaction.

Having obtained this information each topic will be discussed with S&T partners in order to identify the right sources who may have important knowledge about or perspective on the issues among stakeholders. ENIDE leads the process behind stakeholder engagement and will elaborate each topic individually with the involved task leader and organise the first contact.

Targeted stakeholders

Once the specific topics for evaluation are clearly defined, it will be necessary to define and address the target groups. This analysis is based on the general analysis of stakeholder produced in D10.1. HARMONY targeted stakeholders at different levels of governance could be listed as follows:

- Public administration

This group refers to the decision makers, city planners and other public authorities at different geographical levels, as urban areas, regional administrations and national, transnational and international clusters. They can be responsible for the design and/or legislation of the spatial and transport planning in metropolitan areas. HARMONY will provide an evident support for decision making activities at different political levels.

- Business community

This group comprises both business and technical experts. These stakeholders are primarily interested in offering brand new products and improvement of the existing ones to their customers. On the one hand, they take advantage of the innovation constantly introduced by researchers, projects and initiatives. On the other hand, they represent the pioneers of new technologies to be applied by road operators and regulated by policy makers. Business community also includes transport sector stakeholders (e.g. logistics and last mile companies, e-commerce companies, associations, etc).

- Relevant EU, national and international initiatives

Networking activities are expected to ensure interoperability of developed systems with solutions developed in other European projects and strengthen R&D cooperation in Europe so as to foster the

technological developments in Europe. HARMONY results will be also presented by each individual partner to international associations, organisations, fora and working groups that are participating or liaising with and to several stakeholders and renowned (public or industrial) research entities through bilateral discussions and ad-hoc working meetings (i.e. ELTIS, CIVITAS, ALICE etc.)

Some of the potential projects are as follows:

- SETA (<http://setamobility.eu/>)
- WISE-ACT (<https://wise-act.eu/>)
- GECKO (<http://h2020-gecko.eu>)
- MAAS4EU (<http://maas4eu.eu>)
- MOMENTUM (<https://h2020-momentum.eu/>)
- HIGH-TOOL (<http://www.high-tool.eu>)
- TRIMODE (www.trt.it/en/PROGETTI/trimode_project)
- OPTIMUM (<http://www.optimumproject.eu>)
- QUANT (<http://quant.casa.ucl.ac.uk>)
- SENSE (<https://www.senseproject.eu>)
- Maas:CAV (<http://maas-cav.info>)
- INFRAMIX (<https://www.inframix.eu>)

Finally, this effort will have an international scope. European, but also overseas high-profile colleagues involved in similar research activities will be contacted for collaboration.

- Research community

European, but also overseas high-profile colleagues involved in similar research activities will be addressed, such as the: TOMNET - Tier 1 USDOT University Transportation Center at the Arizona State University, USDOT funded National Center for Sustainable Transportation (NCST) at University of California-Davis (UCDavis), GeoTRANS Lab at University of California-Santa Barbara (UCSB), ITSLab at MIT, and ITS at University of California Davis, which have similar projects or centres funded by the USDOT.

- European and international organisations, standardisation bodies and technical communities

HARMONY results will be also presented by each individual partner to international associations, organisations, fora and working groups that are participating or liaising with and to several stakeholders and renowned (public or industrial) research entities through bilateral discussions and ad-hoc working meetings (i.e. ELTIS, CIVITAS, ALICE etc.). These associations at European, national and international level have significant multiplier potential as associations representing transport authorities and members of the industry.

This group also includes standardisation fora and initiatives where HARMONY policy recommendations for AVs and drones will be communicated to advance balanced economic development and social equality. The opportunity to feed back to the standardization floor will ensure a mutually beneficial process. This standardization effort will be directed at the international level as to have a global relevance.

This group includes but is not limited to Eurocontrol (European Organisation for the Safety of Air Navigation), NATS (National Air Traffic Services-UK), the NL Ministry of Infrastructure (Rijkswaterstaat), the Centre of Connected and Autonomous Vehicles of the UK Department for Transport (CCAV, DfT).

- General public

The general public is referred to as all European and international metropolitan drivers and passengers as the immediate end users of spatial and transport planning, as well as all laypersons interested in smart, green and integrated mobility. Informing and communicating with the public as well as fostering societal debate have already become integral constituents of the portfolio of European initiatives.

Channels

Depending on the targeted stakeholder to be addressed, the establishment of contact and the exchange of information with each stakeholder will be carried out in coordination with Task 10.3 (ENIDE) and the task leader who is directly involved in the topic to be addressed. An efficient interaction with stakeholders depends strongly on the expected output and the topic to be addressed. Consequently, the following key aspects will be considered in every engagement activity:

- Objective of the interaction (e.g. input of developments of other projects, input of future plans and problems to be addressed, inputs of the view of the users, alignment of activities, independent evaluation, support in performing corrections, etc.);
- Stakeholders to be addressed and the role of each stakeholder (involved in the development, decision makers, etc.);
- Way of interaction (questionnaire, meetings, conferences, workshops, etc.);
- Timeline/schedule (defined specific month of the project based on the respective tasks, etc.).

HARMONY envisages at least six channels of reach-out strategies:

1. Workshops

HARMONY workshops will not only help introduce stakeholders to the concept, but they will also facilitate their collaboration and involvement through round tables and panel discussions. The importance of workshop is at least threefold:

- As a data collection tool
- As an engagement tool
- As a dissemination tool.

HARMONY will organise three kinds of workshop throughout the project: cross-metropolitan workshop, university training workshop, metropolitan demonstration workshop. Their list and description are provided in D10.1.

2. Interviews and questionnaires

Within individual Harmony demonstrations it is planned to use personal interviews questionnaires, focus groups and online questionnaires as tools to retrieve information from users, passengers and stakeholders to inform the research objectives of the project. This view is important to confirm the strategy of the project as well as to prepare the later survey process that should extend and validate the initial analysis gathered from these interviews. Later in WP9, definition of the scope and tailoring of the interviews and questionnaires depending on the addressed stakeholder should be performed, in order to obtain the maximum value of their input. It is advised that these individuals should be selected from the HARMONY end user group, given their initial involvement in the project activities.

3. HARMONY's boards:

Several groups gathering both HARMONY's partners and external experts will play their role in engaging stakeholders:

- End Users' Group: HARMONY End Users' Group includes core members and a broader network of stakeholders such as transport actors, city and region authorities, service providers, policy makers, standardisation bodies and other public authorities, The underlying reason for creating this group, together with T10.3 and T10.5, is to broaden user acceptance, collect valuable feedback, promote adoption of HARMONY developments and thus secure HARMONY continuity and market penetration.

The Group will be open to joining and will give its participants the choice of simply receiving information or being more actively involved in the project deployment. The latter will comprise the core members of the End Users' Group. These core members will be requested to provide direct feedback on every opportunity (i.e. through participation at HARMONY Stakeholder Workshops), to assist the HARMONY consortium to efficiently evaluate the proposed innovations and perform the required corrections according to the end user needs and

expectations. This group is also expected to help reach consensus regarding the proposed solutions for key issues. The way of collaboration and confidentiality aspects will be decided depending on the strategic reasons and after consultation with partners.

- **DEIC:** The “Dissemination Exploitation Innovation Committee” (DEIC) will gather representatives from all the consortium partners as responsible members for the dissemination, exploitation and innovation activities of the HARMONY project. As part of dissemination activities, the DEIC members will encourage engagement with the targeted audiences, raise awareness amongst the community at large and stimulate dialogue within it.
- **RIAB:** The “Research and Innovation Advisory Board” (RIAB) has been created to engage key stakeholders, collect their direct feedback and efficiently disseminate project results and evolutions. It consists of six external well-known experts who will advise HARMONY partners on scientific and technical activities. Equally, they will also assist with disseminating the project and engaging even more stakeholders.

Table 3 summarizes HARMONY boards and their functions.

Table 3 HARMONY boards and their functions

Board	Perspective	Relation to HARMONY	Type of member	Tasks
End Users' Group	Users' perspective	Mixed internal and external	Transport actors, city and region authorities, service providers, policy makers, standardisation bodies and other public authorities, etc.	Provide feedback, broaden user acceptance, promote HARMONY, etc.
DEIC	Business perspective	Internal	Representatives from all consortium partners	Stakeholder engagement, dissemination activities, innovation strategies, etc.
RIAB	Technical perspective	External	Six experts	Provide feedback, disseminate results, engage more stakeholder, provide independent evaluation

4. Liaison activities

Liaising with related H2020 projects and other currently running and past European and national RDI projects is considered as a very important activity within this task. The aim is to benefit from past findings, to align activities in order to integrate HARMONY in the wider field of sustainable regional mobility and planning. The way of interaction depends on the topics to be addressed and the organisations involved. The concrete way of interaction will be elaborated with the involved task leader and the partners for specific projects, platforms, groups and networks.

A list of targeted projects, platforms and initiatives is provided in Section 3.1.2. This list will be updated whenever new relevant projects or initiatives are identified. In addition, HARMONY consortium members acknowledge and share the CIVITAS objectives and, through playing an active role in the CIVITAS family, hope to contribute towards them. In order to promote the CIVITAS initiative, the HARMONY project will share the project's lessons and conclusions with CIVITAS in order to engage stakeholders within the network.

5. Participation in events

Additionally, the project's partners should participate in relevant events and, when possible, give a presentation on HARMONY's advancement and solutions in order to reach stakeholders who have not been contacted already through the partners' network. HARMONY partners will use these occasions to

- Approach the right stakeholders;
- Inform them about the projects progresses;
- Gain information and feedback from these stakeholders;
- Work directly with them to ensure their concerns are fully understood and considered in decision making;
- Collaborate (e.g. data exchange, joint actions, etc.).

6. Communication campaign

In order to engage and recruit the necessary users and stakeholders for the evaluation activities, a communication campaign will be prepared and executed before them. Given the nature of the action, collaboration between WP9 and WP10 is expected in the different related aspects of the campaign. The main steps of the campaign will be as follows:

- Definition of message(s) for the addressed group(s) as described in section 3.1.1;
- Preparation of promotion material;
- Multi-layer and multi-channel broadcast of the materials;
- Impact assessment and correction of strategy.

A thorough description of communication and dissemination activities envisaged throughout the project is provided in D10.1, where the involvement and participation of relevant stakeholders has also been addressed. The HARMONY consortium does not exclude the possibility to create some merchandising to distribute among the participants at the previously mentioned activities, should it be deemed necessary to enhance attendance.

7. Language applied to the communication strategies

Translation into national languages will be decided case on case basis. As DoW states, with reference to presentations and communication material, “translation into different partners’ languages might be needed in specific occasions to better reach a national audience.” (D10.1). As for surveys, “all the necessary consent forms, data privacy and protection documents and GDPR needed for the surveys will be prepared in T3.1. The forms will be translated to the official language of each metropolitan area” (DoA Part B p.128).

3.2 Supporting materials

This sub-chapter will outline the materials and tools supporting the HARMONY strategies for reaching out to targeted stakeholders. It is imperative that they are consistent across the six metropolitan areas, in order to allow the comparison of the findings. At the same time, they need to be tailored on specific stakeholders’ profiles and on geographic areas’ requirements in order to ensure the quality of the research outcomes.

Supporting materials for workshops

The strategy to engage targeted stakeholders into HARMONY’s workshop will be structured as follows:

- Cities will mobilize their own network by sending invitations to relevant third parties, supported by all other partners. The invitation must include a brief explanation of the objectives of HARMONY as well as sufficiently attractive arguments to ensure a high participation rate, e.g. potential commercial development, networking at an international level, sharing know-how and best practices, merchandising, etc.
- ENIDE will manage the communication and dissemination actions as WP10 leader. All other partners will make sure to put effort in disseminating the event even further.
- ENIDE will manage the drafting of the agenda and the registration process as WP10 leader. S&T partners will make sure to provide their timely contribution to the agenda and to the drafting of relevant templates and presentations to inform the workshop.

Therefore, relevant supporting material includes: the invitation letter, registration tools (such as Eventbrite), the agenda, relevant templates for round tables and panel discussions, presentations, the communication kit as described in D10.2.

Supporting materials for interviews

Semi-structured interviews and questionnaires will be carried out by S&T partners to explore specific research topics with targeted stakeholders. The interviewer should have a guide or template at their disposal, so to help them focus on the topic, all while tailoring their questions to the context, interviewee, etc. The steps to be followed by S&T partners when conducting an interview or questionnaire are as follows:

- Design an interview or questionnaire framework based on the research objectives and on the targeted stakeholder;
- Record only brief notes during the interview (or questionnaire if necessary), then elaborate on the notes immediately after the interview;
- Analyse the information at the end of each day. This can be done with the interviewing team or group.
- Discuss the overall results of the analysis with all involved partners so that they can challenge the perceptions of the interview team. This can make the process even more inclusive.

Therefore, relevant supporting material includes invitation letter, relevant templates and the communication kit as described in D10.2.

Supporting materials for HARMONY boards

HARMONY boards - namely the End Users' Group, DEIC and RIAB - will support the consortium by providing valuable feedback, spreading the project results, broaden user acceptance and engage more stakeholders, among other things. In order to do so, they will need to keep updated on HARMONY developments and to have access to the same communication tools as the consortium members. Therefore, relevant supporting material includes presentations to keep abreast with the project updates, templates for round tables and panel discussions and the communication kit as described in D10.2.

Supporting materials for liaison activities

Liaison activities with other projects, platforms or networks could take many forms, such as joint documents, webinars, workshop and so on. HARMONY commits to provide all requested material and to produce new ones if necessary, in order to ensure the successful implementation of the activity. Therefore, relevant supporting material includes, but is not limited to the invitation letter, registration tools (such as Eventbrite), the agenda, relevant templates for round tables and panel discussions, presentations and the communication kit as described in D10.2.

Supporting materials for events

Participation in external event is considered as a fruitful occasion to align HARMONY activities in order to integrate the project in the wider field of sustainable regional mobility and planning. As such, consortium members involved in these activities will need material to fully participate in the discussion and to engage the audience, for example presentations and the communication material as described in D10.2.

Supporting materials for communication campaigns

Communications campaigns will be primarily held by ENIDE as WP10 leader and will be supported by all partners committing to the widest diffusion possible. For example, sharing and engaging with posts on social media ensures higher visibility to their content. Communication and dissemination activities are outlined in D10.1 and are supported by the communication kit as described in D10.2. The following table summarizes the supporting materials per channel of engagement activities.

Table 4 Supporting materials per channel of engagement activities

Engagement activity	Registration and agenda	Template	Invitation letter	Presentation	Communication kit
---------------------	-------------------------	----------	-------------------	--------------	-------------------



Workshops	x	x	x	x	x
Interviews and questionnaires		x	x		x
HARMONY boards		x		x	x
Liaisons	x		x	x	x
Events				x	x
Communication campaign					x



4. Conclusion

Deliverable 9.1 outlined four major steps of the orchestrating approach for the HARMONY co-creation labs. All the co-creation labs are currently in the process of setting up, identifying concrete activities they are going to carry out in order to achieve the expected results as well as, where relevant, making necessary arrangements and further shaping physical demonstrations.

Each of the co-creation lab has developed an indicative planning for the upcoming 6 months. Progress evaluation form will be then sent to each of the lab in order to verify where the co-creation lab is standing in the process of reaching its expected results and objectives, what are the activities that were carried out during the reporting period, what are the barriers encountered and which facilitators helped to achieve positive results. It will also ask for the next reporting period plans, in order to monitor and evaluate the progress of the co-creation labs.

Stakeholder engagement processes are at the core of each co-creation lab and are of crucial importance to reach its results. Currently all of the co-creation labs are at their setting up phase and are in the process of reflecting on other to the core lab team stakeholders that they need to involve. In the upcoming period they will further shape their co-creation and stakeholder engagement strategies, looking into how increase potential efficiency of the whole process, collecting the feedback and integrating the views of the key stakeholders into their co-creation lab activities.

References

CITYLAB (2015), Practical guidelines for establishing and running a city logistics living laboratory, D.3.1, <http://www.citylab-project.eu/>

HARMONY D1.2 Stakeholder requirements and scenarios for regional spatial and transport planning, 2019.

HARMONY D10.1 Dissemination and communication strategy and plan, 2019.

HARMONY D10.2 Communication kit, 2019.

HARMONY proposal



Section	Data Type	Description
General topography	General topography	Urban area, land/coastline geography, rivers and waterbodies
	Point of Interest Data	e.g. from Google Maps, National Mapping Agencies
	Digital Elevation Model	Digital Elevation Model; Digital Surface Model (excluding buildings)
Administrative Boundaries	Municipal Boundaries	e.g. Municipality/Metropolitan area boundaries
	Local Authority Boundaries	e.g. County/District boundaries
Building Data	Building Footprints	Building footprint outlines
	Building Floorpace / Heights / Storages	Building density datasets- commercial floorpace or building heights, residential units
	Building Function	Function data- office, retail, industrial, residential
Planning Policy Data	State / Public Housing Estates	Location of large public housing estates
	Locations for major future urban development	New town locations, opportunity areas, areas for development
	Planning zoning	Zoning restrictions on urban development; building height restrictions
Other data	Environmental or other development restrictions	Green belt restrictions, national park/reserve restrictions; restrictions on development
	Major future transport infrastructure development	Major rail, metro and road planned developments
	Utility networks	e.g. water, electricity, waste, telecoms, river

Transport Demand Model Data requirements

Data requirements for Transport Demand Modelling						
1. Contact Details of Representative(s)						
Full Name:						
Organisation:						
E-mail:						
2. Existing Software and Network Model Information						
Scope (Passenger and/or Freight):						
Simulation Software Type (e.g. AIMSUN, VISSIM, VISSIM, EMME, SUMO, PARAMICS, TRANSYT, MATSim, etc.):						
4-step or activity-based demand model:						
Study area:						
Baseyear:						
Traffic Analysis Zones (in study area):						
Number of OD pairs:						
Modes (car, truck, bus, rail, bike, etc.):						
License costs:						
3. Data Requirements Specification - Please, provide information regarding the availability of the requested data types and further descriptions						
Data Type	Can data be used in the project? (Yes/No)	When data will be available to the consortium (indicate project month e.g. M4; M1 is May 2019)?	Data Format and source? (e.g., omx, text file, ASCII, csv, shapefile...)	Data Year (e.g. 2019)	Description (e.g. Level of Disaggregation - Temporal/Spatial resolution/scale)	Additional Comments (e.g. links to data sources, data source description)
Passenger Demand Data						
Household travel demand surveys					e.g. generic household travel demand surveys, most of which include vehicle and parking availability, trips, mode choice, usage and other relevant	



HARMONY_MS_data_requirements_initial - Excel										
Tell me what you want to do										
Share Comments										
File Home Insert Draw Page Layout Formulas Data Review View Developer Help										
Clipboard Font Paragraph Alignment Number Styles Cells Editing										
Calibri 11 A ⁺ A ⁻ B I U Merge & Center Conditional Formatting Cell Styles Insert Delete Format AutoSum Sort & Filter Find & Select										
7 8 9 10 11 12 13 14 15 16 17 18										
SP experiments (mode, route or vehicle purchase choice)										
GPS or other geolocation data survey										
Trip or activity or time-use diaries										
Static OD matrix										
Static OD matrix per vehicle type										
Data used for static OD matrix estimation and calibration										
Skim matrices										
Dynamic OD matrix										
Dynamic OD matrix per vehicle type										
Public transport Data on passenger flows (via on-board counts APC or fare collection AFC) – for what sample? When do people validate? Offline or real-time?										
Pedestrian Data										
Pedestrian counts at crossings per direction (estimated or observed)										
Bicycle counts or occupancy at exclusive bicycle lanes (in case of sharing lanes with other modes provide occupancy share)										
Freight demand surveys										
Truck trip diaries										
Freight OD matrix										
Freight OD matrix per mode and/or vehicle type										
Data used for static OD matrix estimation and calibration										
Skim matrices										
Other Data										
Mobile phone data										
Floating phone data										

HARMONY_MS_data_requirements_initial - Excel										
Tell me what you want to do										
Share Comments										
File Home Insert Draw Page Layout Formulas Data Review View Developer Help										
Clipboard Font Paragraph Alignment Number Styles Cells Editing										
Calibri 16 A ⁺ A ⁻ B I U Merge & Center Conditional Formatting Cell Styles Insert Delete Format AutoSum Sort & Filter Find & Select										
7 8 9 10 11 12 13 14 15 16 17 18										
Pedestrian Data										
Pedestrian counts at crossings per direction (estimated or observed)										
Bicycle counts or occupancy at exclusive bicycle lanes (in case of sharing lanes with other modes provide occupancy share)										
Freight Demand Data										
Freight demand surveys										
Truck trip diaries										
Freight OD matrix										
Freight OD matrix per mode and/or vehicle type										
Data used for static OD matrix estimation and calibration										
Skim matrices										
Other Data										
Mobile phone data										
Floating phone data										



Transport Supply Model Data Requirements

AutoSave HARMONY_MS_data_requirements_Initial - Excel Lampros Yfantis

File Home Insert Draw Page Layout Formulas Data Review View Developer Help Tell me what you want to do

Clipboard Font Alignment Number Styles Cells Editing

1. Contact Details of Representative(s)

Full Name:
Organisation:
E-mail:

2. Existing Software and Network Model Information

Scope (e.g. Passenger and/or Freight):
Simulation Software Type (e.g. AIMSUN, VISUM, VISSIM, EMME, SUMO, PARAMICS, TRANSYT, etc.):
Network model spatial coverage (e.g. boundary area or screen shot of the area):
Network Model Baseyear:
Traffic Analysis Zones (in study area):
Traffic Analysis Zones (external):
Number of OD pairs:
Vehicle classes (car, truck, bus, rail, bike, etc.):
License costs:

3. Data Requirements Specification - Please, provide information regarding the availability of the requested data types and further descriptions

Data Type	Can data be used in the project? (Yes/No)	When data will be available to the consortium (Indicate project month e.g. M4; M1 is May 2019)?	Data Format and source? (e.g., omx, text file, ASCII, csv, shapefile...)	Data Year (e.g. 2019)	Description (e.g. Level of Disaggregation - Temporal/Spatial resolution/scale)	Additional Comments (e.g. links to data sources, data source description)
Network data						
GIS shapefile of TAZ system and georeferences of centroids and connectors					e.g. OD matrix scale: (number of OD pairs, number of Origin centroids, number of Destination centroids, year)	
GIS shapefile content information (e.g. does contain lane details, directions and lane-to-lane connectivity in nodes, lane connection crossings information)						

AutoSave HARMONY_MS_data_requirements_Initial - Excel Lampros Yfantis

File Home Insert Draw Page Layout Formulas Data Review View Developer Help Tell me what you want to do

Clipboard Font Alignment Number Styles Cells Editing

GIS shapefile of study area					GIS shapefile content information (e.g. does contain lane details, directions and lane-to-lane connectivity in nodes, lane connection crossings information)	
Open Street Map data					Open Street Map data (e.g. does contain lane details, directions and lane-to-lane connectivity in nodes, crossing information)	
Aerial photography and/or CAD for refinements (Google Streetview can be a replacement for this requirement)					Aerial images of the network (potentially Google aerial images can substitute if not available)	
Bike lane network						
Walking network						
Intersection (node) coordinates					Required	
Section: Road category, speed limit					Required	
Number of lanes					Required	
Length of turn bays					Required	
Lane drop locations					Required	
Lane add locations					Required	
Lane connection information					Required	
Lane channelization					Required	
Link free-flow speed					Required	
Link slope/Grade					Optional	Available in google maps
Lane widths					Optional	
Curvature data					Optional	
Truck info in network geometry. See section NETWORK GEOMETRY					e.g. link accessibility for freight vehicles (by vehicle class)	
Location of multimodal transshipment terminals					e.g. transshipment terminals in maritime ports, road-rail terminals, road-barge terminals, etc.	
Location of distribution centers					e.g. location of distribution centers for local or regional distribution channels	



HARMONY_MS_data_requirements_Initialise - Excel															
File Home Insert Draw Page Layout Formulas Data Review View Developer Help Tell me what you want to do															
Clipboard Font Alignment Number Styles Cells Editing															
Airports location data															
Traffic Control Data															
Sign data (e.g., location of sign data, stop, yield, exit signing and/or lane turning assignment)															
Fixed Signal Control data															
Signalized intersections (for each signal group, signal phases, control plans, coordinates)															
(Semi) Actuated Signal Control data															
Loop detector data															
Ramp Meter Control Data															
Location of variable message signs and set of possible pre-fixed messages															
Location of variable speed signs, operational rules and algorithms used															
Public Transport Data															
GTFS files availability															
Line routing (ideally GIS based)															
Stops location (ideally GIS based)															
Stops assigned to each line															
Timetable covering the simulation period/day															
Type of vehicles used to operate each line (provide fleet size and composition including length, number of doors and which are used for boarding, number of seats, passenger capacity)															
Public transport data on vehicle positions (AVL) – what resolution is it available? Offline or real-time?															
Signal Priority scheme															
Parking Data															
GIS files availability															
On-street parking areas, parking regulation and percentage of occupancy for the period/day to be simulated															
Parking space availability system															
Priority lanes, lane closures for parking during time-of-day/type-of-day, lane or turning closures															
Freight-related data															
City constraints															
Locations for trans-shipment															
Terminal locations															
Customer locations															
Energy, emission, noise data															
Vehicle Engine Type data															
Noise emission data															
Regulations imposed by local governments (e.g. forbidding trucks on specific times, vehicle weight restrictions)															
Transfer locations (intermodal facilities)															
Required															
Required															
Leq noise level data															

HARMONY_MS_data_requirements_Initialise - Excel															
File Home Insert Draw Page Layout Formulas Data Review View Developer Help Tell me what you want to do															
Clipboard Font Alignment Number Styles Cells Editing															
Public Transport Data															
GTFS files availability															
Line routing (ideally GIS based)															
Stops location (ideally GIS based)															
Stops assigned to each line															
Timetable covering the simulation period/day															
Type of vehicles used to operate each line (provide fleet size and composition including length, number of doors and which are used for boarding, number of seats, passenger capacity)															
Public transport data on vehicle positions (AVL) – what resolution is it available? Offline or real-time?															
Signal Priority scheme															
Parking Data															
GIS files availability															
On-street parking areas, parking regulation and percentage of occupancy for the period/day to be simulated															
Parking space availability system															
Priority lanes, lane closures for parking during time-of-day/type-of-day, lane or turning closures															
Freight-related data															
City constraints															
Locations for trans-shipment															
Terminal locations															
Customer locations															
Energy, emission, noise data															
Vehicle Engine Type data															
Noise emission data															
Regulations imposed by local governments (e.g. forbidding trucks on specific times, vehicle weight restrictions)															
Transfer locations (intermodal facilities)															
Required															
Required															
Leq noise level data															

[illegible]

Calibration Data Requirements

AutoSave On

HARMONY_XS_data_requirements_Initialise - Excel

Lamproye Yantis

FileHomeInsertDrawPage LayoutFormulasDataReviewViewDeveloperHelpTell me what you want to doShareComments

PasteCutCopyFormat PainterClipboardFontClipboardsAlignmentNumberStylesCellsEditing

Calibri12A⁺A⁻



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Automatic vehicle identification (AVI) data (e.g., cameras, bluetooth stations) - penetration rate, location and semantics of data collection, e.g. aggregation time, offline or real-time availability																
2																	
3	Automatic vehicle location (AVL) data (e.g., Floating car data, GPS, GSM, etc.) - penetration rate, location and semantics of data collection, e.g. aggregation time, offline or real-time availability																
4																	
5	Saturation flow data																
6	Delay and queue data																
7	Zone to zone taxi travel times/waiting times/speed data																
8	Other																

New Mobility Service Data Requirements

1. Mobility Service Data						
1. Contact Details of Representative(s)						
Full Name:						
Organisation:						
E-mail:						
2. Data Requirements Specification - Please, provide information regarding the availability of the requested data types and further descriptions						
Data Type	Can data be used in the project? (Yes/No)	When data will be available to the consortium (indicate project month e.g. M4; M1 is May 2019)?	Data Format and source? (e.g., ome, text file, ASCII, csv, shapefile...)	Data Year (e.g. 2019)	Description (e.g. Level of Disaggregation - Temporal/spatial resolution/scale)	Additional Comments (e.g. links to data sources, data source description)
Traditional Taxis (Cabs) - Supply data						
Fleet size:						
Fleet composition/Vehicle Types/Number for each type:						
Vehicle Capacities:						
Fuel Consumption:						
Others ...						
Ridehailing service data (e.g. Uber, Lyft, Kapten, ViaVan, etc.) - Supply data						
Fleet size:						
Fleet composition/Vehicle Types/Number for each type:						
Fuel Consumption:						
Vehicle Capacities:						
Others ...						
Station-based or free-floating Carsharing (DriveNow, car2go, etc.) - Supply data						
Fleet size:						
Fleet composition/Vehicle Types/Number for each type:						
Vehicle Capacities:						
Station capacity/dock-parking numbers:						
Fuel Consumption:						



HARMONY_MS_data_requirements_Initial.xlsx - Excel															
Lampros Ylatis															
Tell me what you want to do															
Share Comments															
Clipboard Font Alignment Number Styles Cells Editing															
Station-based or free-floating Carsharing (DriveNow, car2go, etc.) - Supply data															
22	Fleet sizes														
23	Fleet composition/Vehicle														
24	Types/Number for each type														
25	Vehicle Capacities														
26	Station capacity/dock-parking numbers														
27	Fuel Consumption														
28	Others ...														
Station-based or free-floating Bikes (Santander bikes, Lime, Ofo, OBIke, etc.) - Supply data															
29	Fleet sizes														
30	Fleet composition/Vehicle														
31	Types/Number for each type														
32	Vehicle Capacities														
33	Station capacity/dock-parking numbers														
34	Fuel Consumption														
35	Others ...														
Station-based or free-floating Scooters (Lime, VOI, etc.) - Supply data															
36	Fleet sizes														
37	Fleet composition/Vehicle														
38	Types/Number for each type														
39	Vehicle Capacities														
40	Station capacity/dock-parking numbers														
41	Fuel Consumption														
42	Others ...														
Ride-sourcing/Ride-hailing/E-hailing/Ridesharing apps (Uber, Gett, Kapten, ViaVan, etc.) - Demand data															
43	Trips /ODs														
44	Driving Profiles														
45	Others														
Station-based or free-floating Carsharing (DriveNow, car2go, etc.)															
46	Static or dynamic daily station/zone stock														
47	level data														
48	Trips /ODs														
49	Rentals/Bookings														
50	Others														
Station-based or free-floating Bikes (Santander bikes, Lime, Ofo, OBIke, etc.)															
51	Static or dynamic daily station/zone stock														

HARMONY_MS_data_requirements_Initial.xlsx - Excel															
Lampros Ylatis															
Tell me what you want to do															
Share Comments															
Clipboard Font Alignment Number Styles Cells Editing															
Station-based or free-floating Bikes (Santander bikes, Lime, Ofo, OBIke, etc.)															
52	Static or dynamic daily station/zone stock														
53	level data														
54	Trips /ODs														
55	Rentals/Bookings														
56	Others														
Station-based or free-floating Scooters (Lime, VOI, etc.)															
57	Static or dynamic daily station/zone stock														
58	level data														
59	Trips /ODs														
60	Rentals/Bookings														
61	Others														
Traditional freight operators (Trucks)															
62	Fleet sizes														
63	Fleet composition/Vehicle														
64	Types/Number for each type														
65	Vehicle Capacities														
66	Speed														
67	Fuel consumption														
68	Zone to zone travel times and loading/unloading times														
69	Others														
Crowdshipping															
70	Fleet sizes														
71	Fleet composition/Vehicle														
72	Types/Number for each type														
73	Vehicle Capacities														
74	Speed														
75	Fuel consumption														
76	Zone to zone travel times and loading/unloading times														
77	Others														
Cargo Bikes															
78	Fleet sizes														
79	Fleet composition/Vehicle														
80	Types/Number for each type														

[illegible]

Annex B. Periodic progress evaluation template

Co-creation lab:
Co-creation lab partner:
Date:
Name:
Reporting period:
Were there any changes in the objectives and scope of the co-creation lab?
Description of the activities carried out since the last reporting period:
Which barriers (in relation to the activities carried out) have you experienced during this period?
Please identify crucial factors of success (if any) that helped you to achieve the results during this period?
What were the lessons learnt during this reporting period?
Please list and describe the key stakeholder engagement moments that took place during this period (stakeholder groups, quantity, co-creation strategy, results achieved, etc).
Please provide indicative planning for the upcoming 3-6 months of the project.

Annex C. Scenarios for evaluation

Future Scenarios and Implementations for AVs and UAM			
Comment: These are future scenarios that have been investigated and discussed in the literature. They are not either spatial or transport planning policies (policy interventions). Our objective is to discuss on those future scenarios and extract from the workshop how regional spatial and transport planning policy, among others should and could adjust to the emergence of those services aiming for sustainability			
Title	Brief Description	Title	Brief Description
Passenger Mobility		Freight Mobility	
Autonomous Vehicles			
Privately owned Avs	Scenario where ouseholds replace their private vehicles with Avs	Zero Emissions zones in city logistics	ZE vehicles service companies and consumers inside the ZE zones
Door-to-door autonomous e-hailing or/and ridesharing service	Automated passenger vehicles/pods offering single rides from any point to any point; riders have acces to the service via an smart-phone or web-based interface or Automated passenger vehicles/vans offering shared rides from any point to any point; riders have acces to the service via an smart-phone or web-based interface; access to pick-up and drop off locations might require short walking	Dedicated autonomous urban distribution services	Use of autonomous vans in restricted car-free areas
Fixed or demand responsive AV Shuttle service	Automated passenger minibuses offering transit rides between variable locations with varying schedules; riders have acces to the service via an smart-phone or web-based interface; access to pick-up and drop off locations might require short walking or Automated passenger minibuses offering station-to-station transit rides with varying schedules	Autonomous trucks and truck platooning	Use of platooning and automated trucks in specific transport corridors (i.e connection between cities)
Carsharing Services with Avs	Station-based or free-floating Avsl	Autonomous trucks	Autonomous trucks services connecting terminals with DCs
Replacement of bus fleet with Av	PT bus fleets ar fully replace by electricalmAVs	Delivery bots	Delivery bots for specific deliveries in local small scale areas (CBD, campuses such as TU Delft)
Integrated PT and AV services	e.g first-/last-mile to PT -> Automated passenger vans/minibuses offering station-to-door and door-to-station rides; Avs are operated and offered by PT or private provider or MaaS Provider offering all or cmbination of the above services via a single app; riders plan and access the service via the app		
UAM -Drones and Air Taxis			
		Express delivery services	Drone delivery service for dedicated high value deliveries inside urban areas
		Port delivery services	Drone delivery service to ships in the Port of Rotterdam
		Express delivery in remote areas	Drone delivery services connecting cities with rural areas (Trikala)

Annex D. Template for round table

How we can take this forward		Challenges and roadblocks	
What critical things must happen?	Does it require an investment, policy intervention, infrastructure investment, direct application?	What will make this fail?	How we can avoid it?
What are the objectives and subobjectives?			

Who needs to be involved		KPIs and expected outcome	
Critical authorities to be involved?	Whose expertise is required?	What KPIs will make this accepted and implemented? (safety, traffic efficiency, user acceptability, environmental impact, at the global level (at the network level) or local level (use case area))	What would be a baseline and analysis tools? (What key findings are required?)
???			

Annex E. Data privacy and protection issues

To tackle the personal data privacy and protection issues, HARMONY has allocated resources in WP3 (T3.1 and T3.4). All the necessary consent forms, data privacy and protection documents and GDPR needed for the surveys will be prepared in T3.1. The forms will be translated to the official language of each metropolitan area. The five HARMONY universities will further request for an Ethics and GDPR approval by the dedicated offices at the universities. All necessary privacy enhancing principles and technologies for storing and preserving the privacy of end users' and other stakeholders' sensitive data will be covered in T3.4. T3.4 undertakes the definition of the HARMONY Access Policy Model, defining the rules based on which different actors have discrete access rights to the data stored in the TSDW, as well as the implementation of the "HARMONY Data Access Mechanism", which realises the different data access policies represented using the Access Policy Model. Data privacy issues will strictly follow the principles and guidelines of the GDPR (2016/6791).

In addition, WP11 has a task completely devoted to "Ethics Management" (T11.5). The leader of this task will review and approve all the ethics forms required in the project, the data handling and storing security standards, the data controllers and data processors, the data encryption/anonymisation and removal. T11.5 is responsible for monitoring the full implementation of ethics requirements, GDPR standards and also for assigning a Data Protection Officer (DPO). To ensure ongoing monitoring, an ethical issues report will be included in the annual reports.

Finally, it is worthwhile to mention that all HARMONY partners are based in EU and follow the GDPR standards. In addition, the five universities have dedicated Ethics Research and GDPR Offices that also have to approve any data collection effort in advance.

Annex F. Technical description of the vehicles

In the demonstrations of Rotterdam and Oxfordshire vehicle from the project partner Arrival will be used. These vehicles are will be electric and will be able to drive autonomous. In this Annex further details of the vehicles will be given.



Figure 5: Arrival van (type H3/L4).

The specifications of the Arrival van type H3/L4 has the following specifications:

Performance

kWh	67	89	111	133
Gross Vehicle Weight Rating	4250 kg	4250 kg	4250 kg	4250 kg
Unladen	2275 kg	2395 kg	2515 kg	2635 kg
Max. payload	1975 kg	1855 kg	1735 kg	1615 kg
Range	180 km	240 km	290 km	340 km
DC peak capacity	120 kW	120 kW	120 kW	120 kW
AC peak capacity	11 kW	11 kW	11 kW	22 kW

Exterior

Wheelbase	3550 mm
Length	5800 mm
Height	2730 mm
Width (wheelarches)	2075 mm

Cargo interior

Cargo volume	14 m3
Loading length	3450 mm
Loading width	1950 mm
Loading height	2235 mm



[@HARMONY_H2020](https://twitter.com/HARMONY_H2020)

#HARMONY-h2020



<https://www.linkedin.com/company/HARMONY-h2020/>

For further information please visit www.HARMONY-h2020.eu



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 815269

