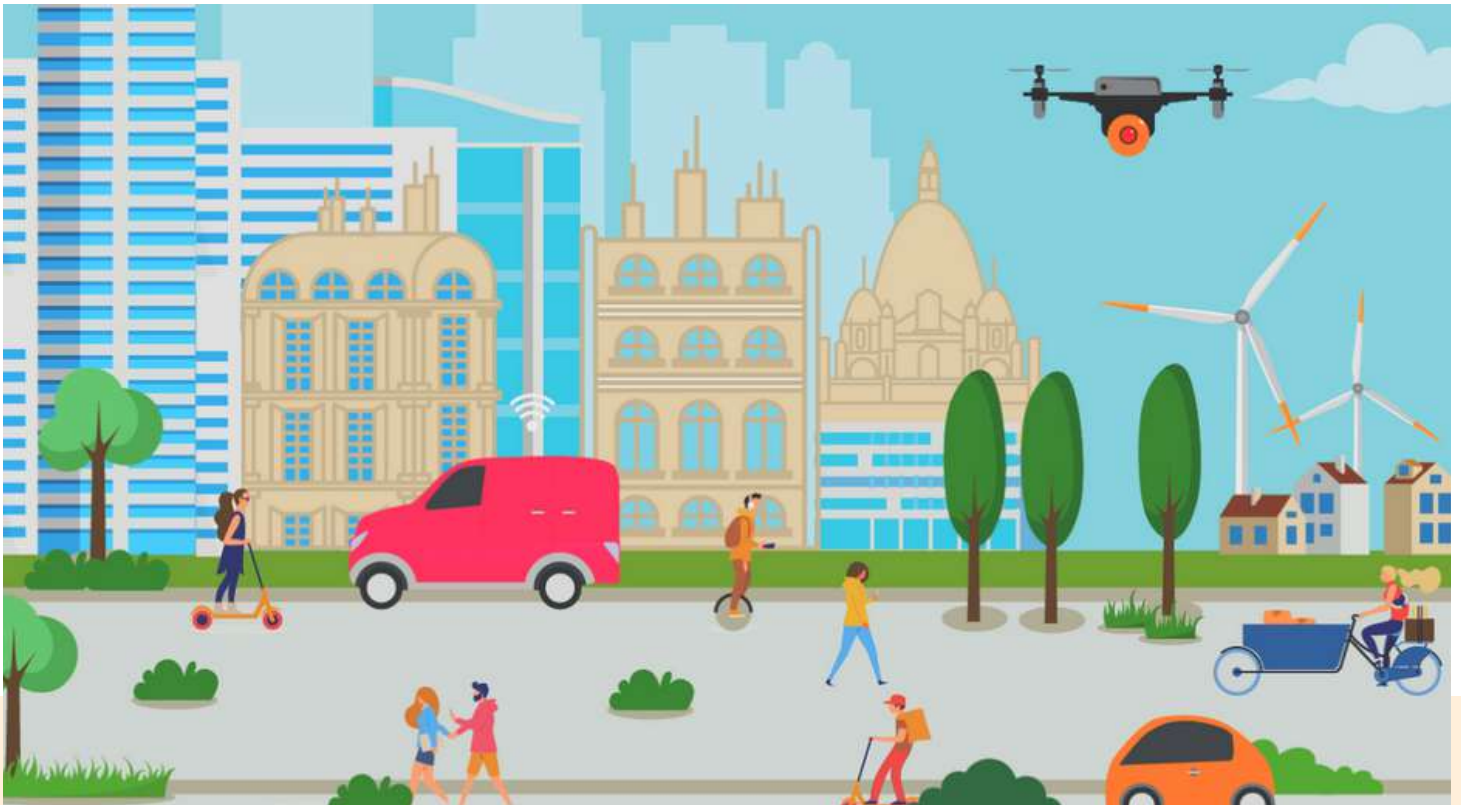




# HARMONY

SPATIAL & TRANSPORT PLANNING FOR A NEW MOBILITY ERA



## HARMONY IS FINALIZING THE MODEL SUITE

HARMONY is at its final stage of developing the HARMONY Model Suite: a new generation platform for integrated spatial and transport planning modelling. We are almost there! The project objectives are soon to be accomplished.



# HARMONY IS TAKING ITS FINAL STEPS TOWARDS THE FINISH LINE!

HARMONY is now in its final stage of developing the HARMONY Model Suite; a new generation platform for integrated spatial and transport planning modelling. The team is now ready for fine-tuning!



## A message from HARMONY's Project Coordinator Prof. Maria Kamargianni:

Going through several rounds of co-creation activities, the HARMONY Modal Suite is almost ready to launch!

The vision of HARMONY, the H2020 project, is to enable metropolitan area authorities to lead a sustainable transition to a low-carbon new mobility era, by developing a Model Suite (MS) that harmonises spatial and multimodal transport planning models allowing HARMONY MS users to comprehensively model the dynamicity of the changing transport sector and spatial organisation in urban and regional areas.

- **The HARMONY platform has been applied** so far in **Rotterdam** to simulate Zero Emission Zone scenarios for freight, and in **Athens** to simulate how traffic flows will change given land-use changes in the Elliniko area.
- We are now **in the process of applying the HARMONY MS** for **Oxfordshire** to simulate scenarios related to demand responsive autonomous vehicles, MaaS and land use; and in **Turin** to simulate how citizens' travel patterns change when MaaS services are available.
- We have **used the MOBYapp**, developed through the project, to collect travel demand data in **Oxfordshire** and **Turin** for the development of activity-based models.

During the second Review Meeting which took place in Athens, in July, we received useful feedback from CINEA-European Climate, Infrastructure, and Environment Executive Agency. **The team is now ready for fine-tuning!**



## STAY TUNED!

**FROM OCTOBER 2022 THE HARMONY TRAINING COURSES START IN SEVERAL LOCATIONS AROUND EUROPE! THE COURSES WILL TRAIN MODELLERS, PLANNERS AND DECISION MAKERS ON HOW TO USE THE HARMONY MS.**



## Moby App



**MOBY APP RECORDED APPROX. 10,200 HOURS OF TRAVEL DATA RELATED TO APPROX. 19,000 TRIPS IN THE FUNCTIONAL URBAN AREA OF TURIN, INCLUDING 88 MUNICIPALITIES!**



# COLLECTING TRAVEL DEMAND DATA SMART AND FAST: MOBYAPP COLLECTS DATA IN TURIN

*Moby App, a new approach for travel demand data collection that has been used in Turin.*

Within the HARMONY project, a new approach for travel demand data collection has been used in Turin: a free smartphone application, MobyApp, was developed for Android and iOS. Downloading the application, the survey participants need only to start tracking their trips and activities, and the whole travel diary is tracked and recognized by the application.

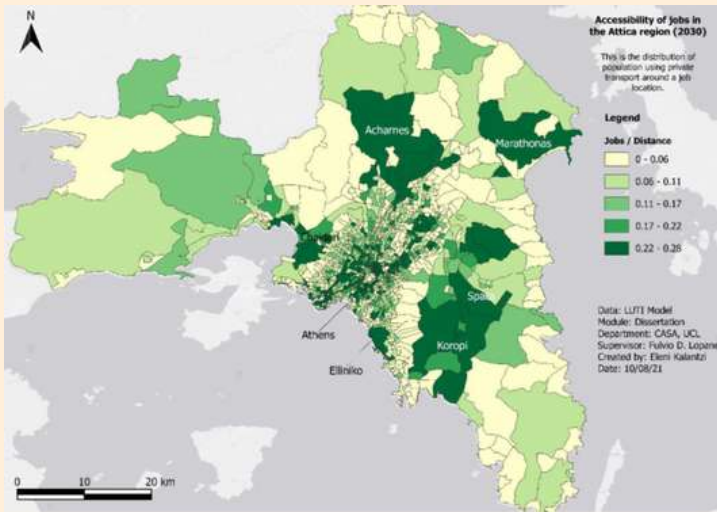
Start/end travel time, path, and mode choice are automatically recognized by **MobyApp**. This way, the travel diary is composed of real data, collected through the smartphone's GPS. User supervision is needed to validate the collected data. Moreover, in the application a few questionnaires are proposed, to collect additional information on transport behaviours. Personal attitudes towards changes in the travel diary, or autonomous vehicles, are examples of useful information that the questionnaires can provide.

In **Turin**, the travel survey has been performed in February 2022. Namely, 584 users aged 18 to 65 years old downloaded the application and tracked their trips during a period from 4 to 7 days. The study area where the users have been selected is the Functional Urban Area of Turin, including 88 municipalities. **Within the survey, about 10,200 hours of travel data have been recorded related to about 19,000 trips.**

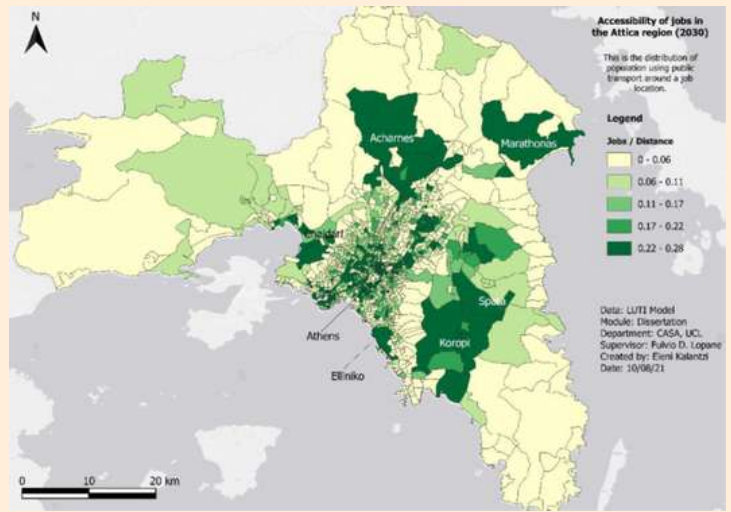
To complement the data collected with the predefined sample of individuals, an additional survey on a voluntary basis has been performed in Turin in March 2022: about 113 users downloaded the App, and 61 have been tracking for at least 1 day.



# HARMONY MS STRATEGIC SIMULATOR: THE APPLICATION IN ATHENS



**EMPLOYMENT ACCESSIBILITY OF PEOPLE USING PRIVATE TRANSPORT IN THE ATTICA REGION (2030)**



**EMPLOYMENT ACCESSIBILITY OF PEOPLE USING PUBLIC TRANSPORT IN THE ATTICA REGION (2030)**

The **HARMONY Model Suite (MS)** captures decisions and interactions of entities like travellers, logistic operators, mobility service operators and decisions makers that are represented as agents in the modelling framework on three different conceptual levels:

- **Strategic (long-term):** It is a simulator composed of an integrated suite of aggregate and disaggregates land-use, socio-demographic, regional, economic, and long-term logistics choice models.
- **Tactical (mid-term):** It is an integrated agent-based transportation demand and supply modelling framework that incorporates two main sub-models, a passenger, and a freight simulator.
- **Operational (short-term):** It is an integrated demand and supply simulator operating in short term. It captures travellers' dynamic route choices on a multimodal supply network, as well as the daily operations performed by several mobility service operators.

The Athen's application of the **HARMONY Strategic Simulator** makes use of a Demographic Forecasting model, a Regional Economy Model, a Land-Use Transport-Interaction model and a Land Development model. **Its goal is to simulate a large-scale urban and infrastructure development:** the requalification of the former Elliniko Airport, which concerns the creation of a Metropolitan Pole with multiple functions of national and international relevance.

The results of this application will be reported in **HARMONY's Deliverable D4.3 "Applications of the strategic simulator and forecasting"** (due in November 2022). The outcomes consist of population and economic projections for the Attica region for the years 2030 and 2045 (time scale of the Elliniko intervention), together with predictions on people's journeys to work by different modes of transport (public and private), accessibility maps (jobs and housing – see pictures) and residential development suitability and desirability maps.

# HARMONY MS TACTICAL FREIGHT SIMULATOR: THE APPLICATION IN ROTTERDAM

The city of Rotterdam is on a mission to reduce CO2 emissions by 49% until 2030! One of the measures to do so is by introducing a zero-emission zone which will invoke a shift to zero-emission city logistics.

Due to various transition possibilities, a case study was implemented, covering different heterogenous transition scenarios for each logistic segment into HARMONY's Tactical Freight Simulator (TFS) and analyzing the systemwide impacts. TFS helped simulate the impacts of these expert-based scenarios: consolidation to urban consolidation centres, shift to new vehicles.

**Its key design principles are what make the TFS an efficient and accurate tool for forecasting impacts on logistic developments and scenarios:**

- model is multi-agent
- empirical
- shipment-based
- it simulates both: long-term tactical choices (distribution channel choice, shipment size and vehicle type choice, sourcing) and short-term tactical choices (tour formation, delivery times).



**Interesting conclusions were drawn:**

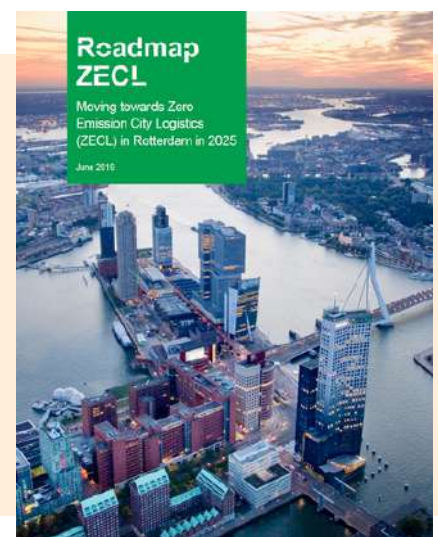
- Impacts are not trivial: emissions within the zero-emission zone are reduced, but vehicle kilometres outside the zone increase slightly as a result of the rerouting of shipments through the urban consolidation centres.
- Emissions are reduced by 90% inside the zero-emission zone; at the city scale by 10%, considered a significant impact at the city level.
- A zero-emission zone is a good step toward the ambition to reduce CO2 emissions by 49% by 2030, but more measures are needed to further decarbonize long-haul freight transportation.

Read a full article: [here](#)



**PAPER “APPLICATION OF THE HARMONY TACTICAL FREIGHT SIMULATOR TO A CASE STUDY FOR ZERO-EMISSION ZONES IN ROTTERDAM”, PRESENTED AT TRB CONFERENCE JAN 2021, AND PUBLISHED IN TRR. (OPEN ACCESS)**

**Best Research Paper award @TRB 2021!**



## SAVE THE DATE!

HARMONY organises dedicated sessions at international conferences and events as part of its dissemination activities. Join our next ones! Event details will soon be available (keep an eye on our website and social network channels).



**LISBON 2022**  
14 - 17 NOVEMBER

**REGISTER NOW!**

[CLICK HERE](#)

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 HARMONY #TRA2022

### HARMONY WILL TAKE PART AT THE TRA CONFERENCE 2022

HARMONY will take part at the TRA 2022 conference presenting “An empirical demand model for e-commerce and shopping trips” and “Forecasting parcel deliveries in an urban freight simulator for the province of Zuid-Holland”. Also, the paper “Advancing Travel Demand Surveys Using a New Generation Smartphone-based Platform: Applications and Users’ Experience” has been accepted for the conference and will be presented! TRA, the Transport Research Arena, is the largest European research and technology conference on transport and mobility.

### HARMONY THIRD CROSS METROPOLITAN WORKSHOP AT THE POLIS CONFERENCE 2022

HARMONY will hold its Third Cross Metropolitan Workshop at the POLIS Annual Conference! The conference provides an opportunity for cities and regions to showcase their transport achievements to a large audience of mobility experts, practitioners and decision-makers.



Third Cross  
Metropolitan Workshop

**POLIS**  
CITIES AND REGIONS FOR TRANSPORT INNOVATION

BRUSSELS, BELGIUM

**ANNUAL CONFERENCE 2022**  
Nov 30

**REGISTER NOW!**

[CLICK HERE](#)

The cross-metropolitan approach will give us the opportunity to collect a wide range of requirements from areas with different demographic, economic growth and travel need characteristics.

#### FACTSHEET

Duration: 1 June 2019 - 30 November 2022

Coordinator: Maria Kamargianni, University College London - m.kamargianni@ucl.ac.uk

Dissemination: Francesc Rosinés, ENIDE, francesc.rosines@enide.com



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