20 October 2021

HARMONY
SPATIAL & TRANSPORT PLANNING FOR A NEW MOBILITY ERA

HARMONY
second cross-metropolitan workshop

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UCL

Vision

Develop **a new generation of harmonised spatial and multimodal transport planning tools** which comprehensively model the dynamics of the changing transport sector and spatial organisation, enabling metropolitan area authorities to lead the transition to a low carbon new mobility era in a sustainable manner.

Main outcomes

- The HARMONY MS (software)
- AVs and drones demonstrations
- Training material and activities for using the HARMONY MS
- Recommendations for SUMPs update (AVs & drones included)

Challenges

- Several models for some cities / no models for others
- Fragmented models with limited interaction
- Increasing possibility of applying policies and measures with rebound effects to other sectors.

HARMONY model suite

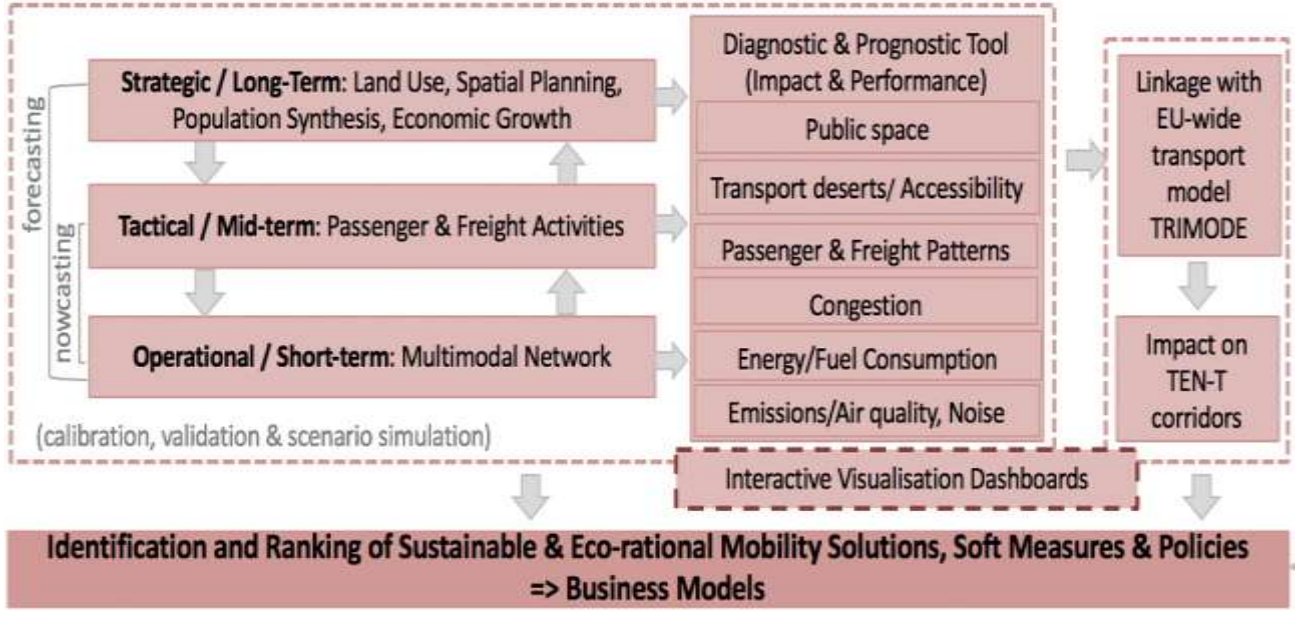
Multi-scale, software-agnostic, integrated activity-based model system

Integration of new and existing sub-models, including:

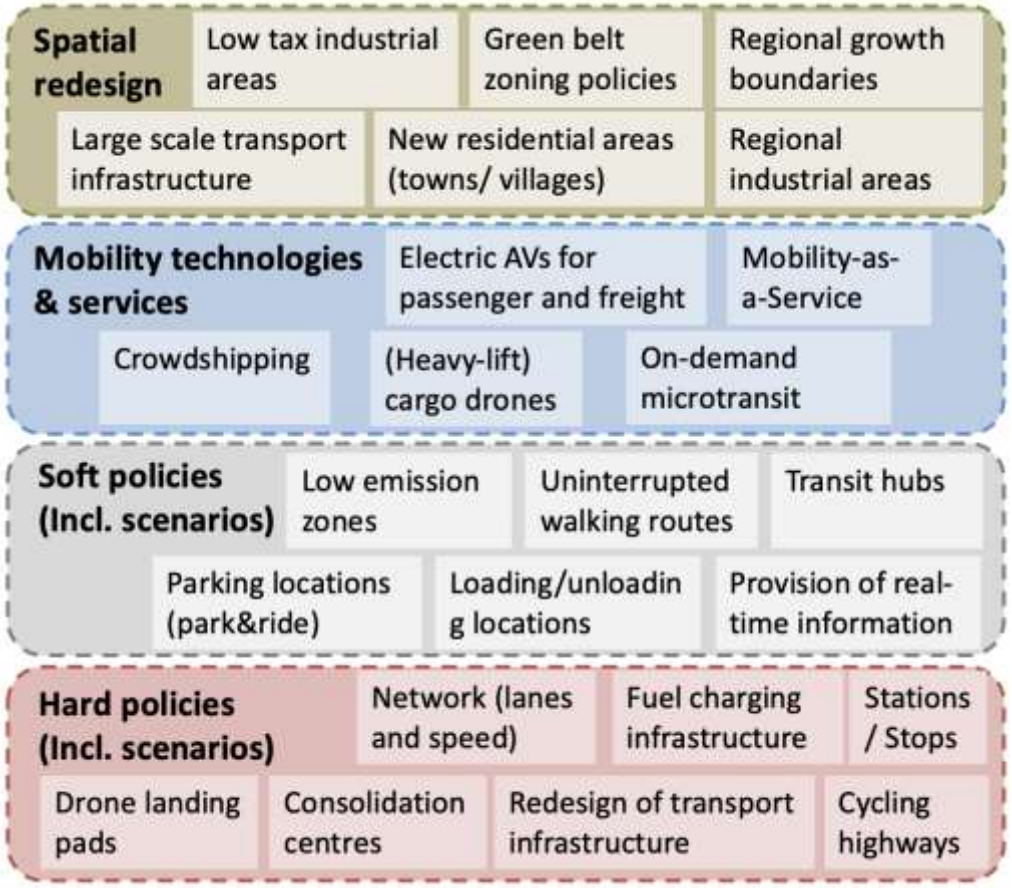
- land-use models (strategic/long-term),
- people and freight activity-based models (tactical/mid-term), and
- multimodal network models (operational/short-term).

Enables end-users to couple/link independent models and analyse a portfolio of regional and urban interventions for both passenger and freight mobility:

- policies and capital investments,
- land-use configurations,
- economic and sociodemographic assumptions,
- travel demand management strategies
- new mobility service concepts.



Simulation Scenarios - Indicative



+ COVID-19 related scenarios: local lockdowns, increased demand of e-commerce, reduced capacity of public transport, new hospitals, employment, changing demographics etc.

Key Performance Indicators - Indicative

Land-Use & Infrastructure	Environment	Regional Economy	Inclusive communities
Change in inter-/intraregional transport infrastructure capacity	Noise levels (e.g. Persons highly annoyed)	Change in population density	Transport affordability/poverty
Mode sharing infrastructure/ Public space	Carbon intensity (CO2, NOx, emissions)	% change in number of VAT registered business	Transit accessibility/ desserts
Increase of risk mitigation measures (resilience)	VMT per mode	Investments attracted	Measures of well-being

Application of the Strategic Simulator for the Athens Greater Area

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Strategic Simulator: Athens

Two scenarios were built in order to assess the impact of the renovation of the former airport in Elliniko into a metropolitan pole of attraction:

1. Elliniko Scenario 2030 (50% of the Elliniko project will be completed): Changing employment by adding 25.000 new temporary jobs to 4 out of 1264 zones.
2. Elliniko Scenario 2045 (Elliniko project will be fully completed): Changing employment & residential floorspace by adding 90.000 permanent jobs & 291,5 ha to 4 out of 1264 zones.

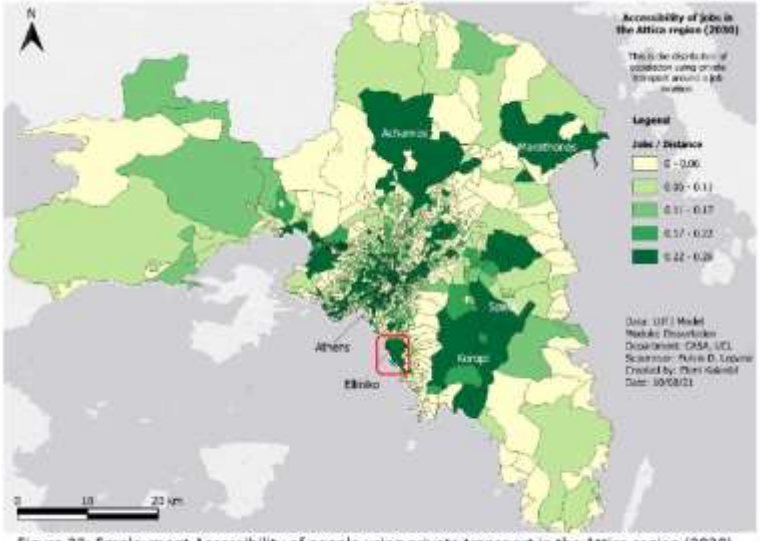

Figure 22: Employment Accessibility of people using private transport in the Attica region (2030) (the red highlighted area is the scenarios' area of Elliniko)

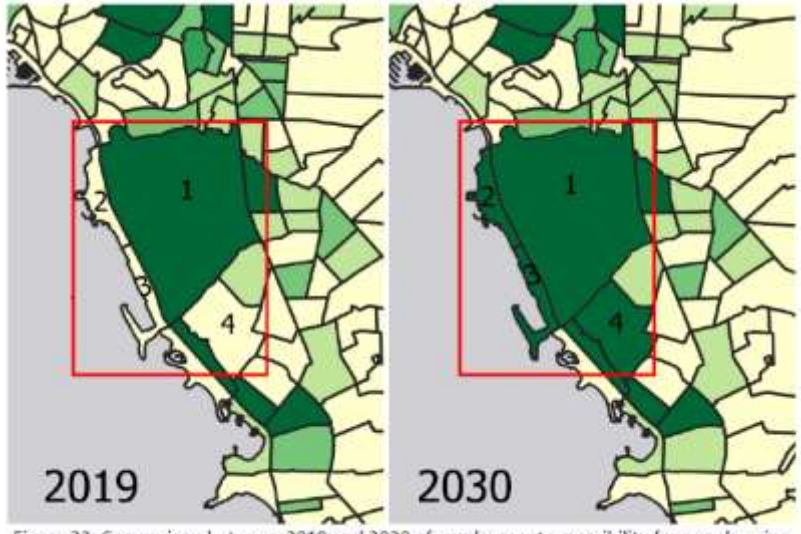

Figure 23: Comparison between 2019 and 2030 of employment accessibility for people using private and public transport in Elliniko (the red highlighted area is the scenarios' area of Elliniko)

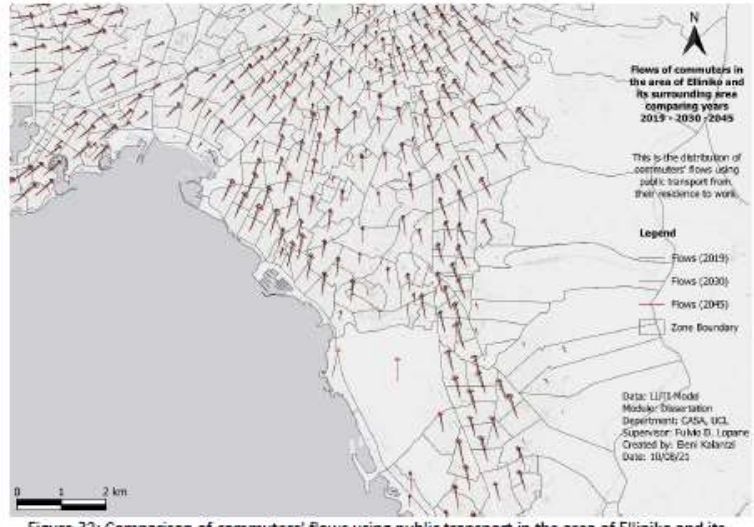

Figure 32: Comparison of commuters' flows using public transport in the area of Elliniko and its surroundings (2019-2030-2045)

Application of the Strategic + Tactical Simulator for Rotterdam

TUDelft, Significance

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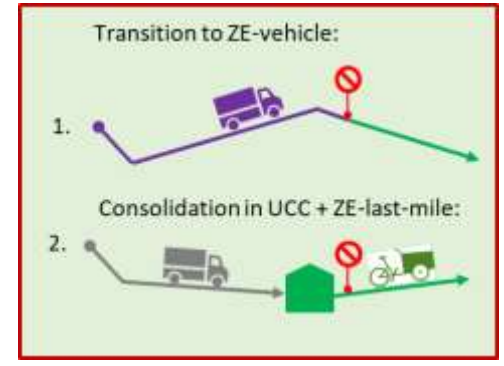
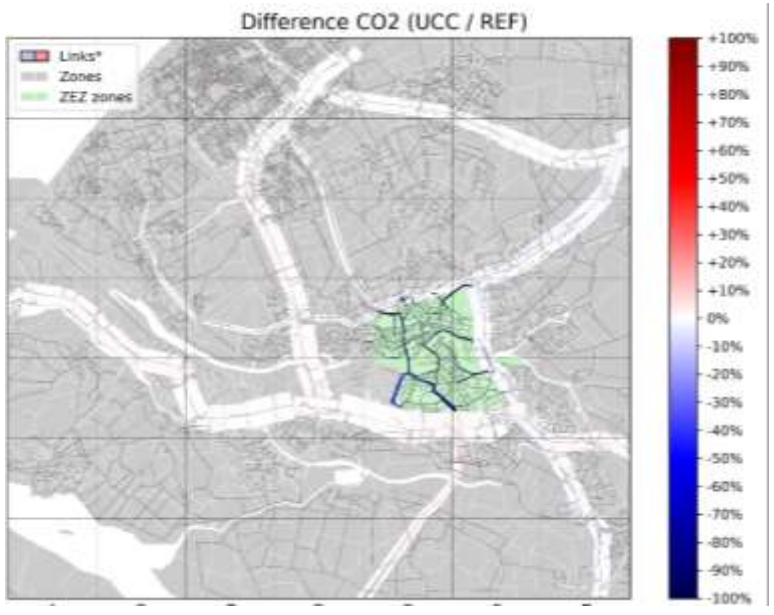
Strategic + Tactical Simulator: Rotterdam

Scenarios for the introduction of the ZE-zone on urban distribution:

1. Shift from conventional to ZE-vehicle (electric, Hybrid)
2. Consolidation in a dedicated hub (UCC), and last-mile using ZE-vehicles.





Results:

- Reduction in total emissions within the municipality of Rotterdam: ca. 8%. This includes all the freight traffic to and from the port area.

Type	Inside the ZEZ	City of Rotterdam	Study area (prov. South Holland)
CO2	-91%	-8%	-1%

- Rerouting of shipments to the hubs also leads to small increases of emissions in the surrounding area.

Strategic + Tactical Simulator: Rotterdam

Heatmaps: where to localise loading infrastructure for HGV?,

or: where is energy demand located?

Outputs (vehicle patterns and stoplocations) simulated by the TFS are used to calculate Heatmaps of energy demand, either at Loading locations, Unloading locations or en-route.

Application of the Strategic + Tactical + Operational Simulator: Oxfordshire County

University of Wolverhampton, Aimsun, UCL, Airbus

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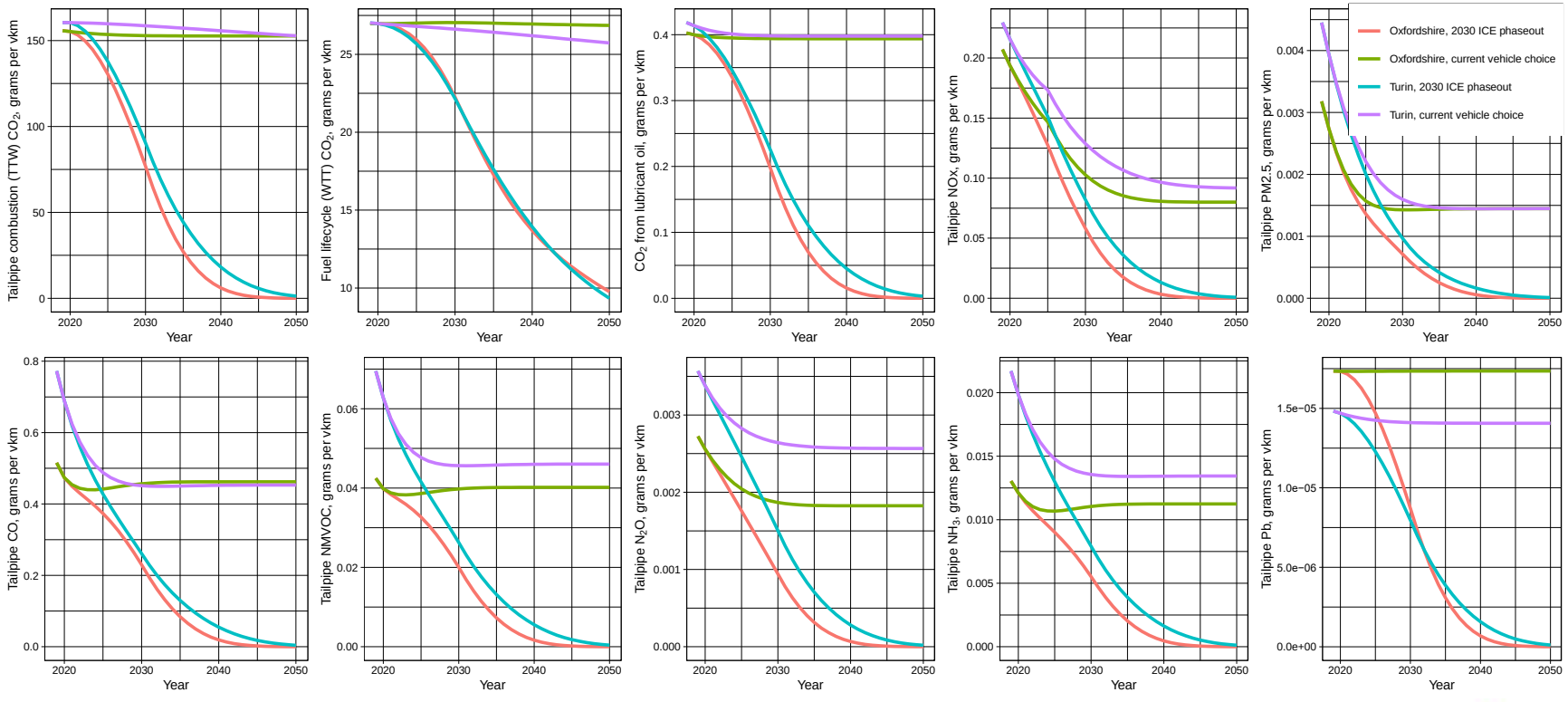
HARMONY MS: Oxfordshire

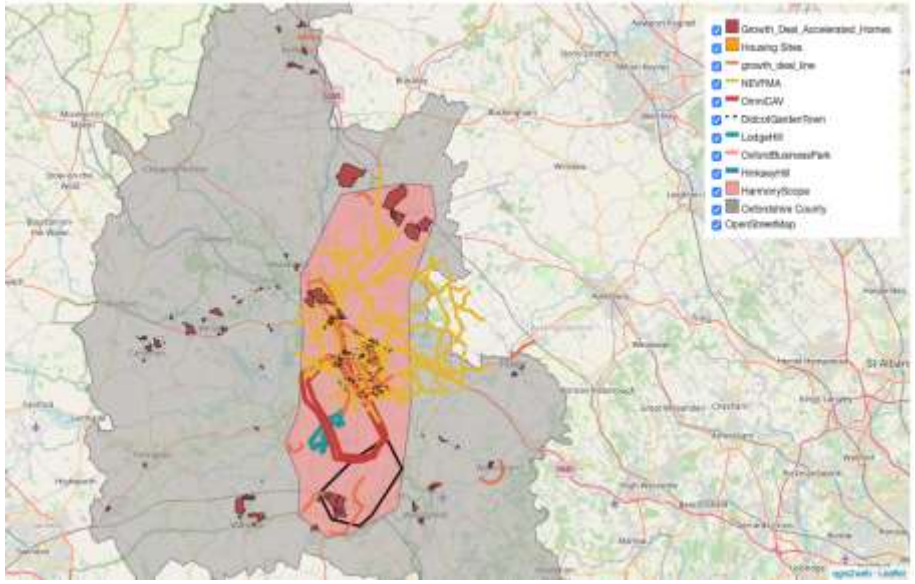
Energy and emissions model

- Testing the model emissions/vkm for a standard drive cycle and two different assumptions about how fleet develops: current vehicle choice is maintained vs. 2030 ICE phaseout



HARMONY MS: Oxfordshire

Scenarios for collaboration of drones with vans for freight deliveries



HARMONY Metropolitan Areas' Activities

Rotterdam
- Electric AV demonstration - Freight
- HARMONY MS - Freight

Oxfordshire
- Electric AV demonstration - Passenger & Freight
- Drones demonstration - Freight
- HARMONY MS - Passenger

Trailblazing

Athens
- HARMONY MS - Strategic

Turin
- HARMONY MS - Strategic & Tactical

Aspiring

Trikala
- Drones demonstration for medical purposes

Katowice (GZM)
- Adopter metropolitan area

Follower

Drones demonstration: Trikala

E-Trikala, University of the Aegean, UCL

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Drones demonstration: Trikala

Working with the community

- Hellenic Civil Aviation Authority
- Pharmaceutical Coop. of Trikala Pharmacists
- Altus S.A.
- Municipality of Trikala
- e-Trikala
- UAegean
- UCL
- Sponsors: HAMsystems and Anytime (Interamerican)

Initial scenario: Drones to deliver medicines to the elderlies in the villages around the city

Challenges:
- Medicines must be delivered to the person who has subscription
- Flying over citizens heeads
- Ensure the box conditions (temperature and moisture sensor that could be monitored by the pharmacist)

Final scenario tested:
- Drone to deliver the medicines to the pharmacist of the village.

Business opportunities:
- Develop systems that can recognise the recipient and deliver directly to him/her

Drones demonstration: Trikala

- The box containing the medicines was able to be opened remotely by the drone operator or by the pharamacist.
- The pharmacict was informed by GPS tracker that was available in the mobile of the pharmacist or by a platform ‘ADS-D transponder’ (Altitute, GPS coordinates, heading and velocity).
- Both SIFTA (Pharmaceutical Coop. of Trikala) and the pharmacist have access in the two applications.
- A training module has to be prepared for the pharmacists on how to approach the UAV safely and to operate the transportation box.
- An elevated landing base was constructed with landing appropriate signs both in taking-off and landing points.
- The drone has returned back to GISEMI HUB.
- A re-routing of the evacuated roads had to take place.

Challenges faced in the demos and lessons learned

HARMONY MS
Integrated spatial and transport simulation software

HARMONY consortium

21 partners from 9 European countries

HARMONY

SPATIAL & TRANSPORT PLANNING FOR A NEW MOBILITY ERA

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

CIVITAS

Sustainable and smart mobility for all