

The HARMONY Model Suite

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The HARMONY Model Suite (MS)

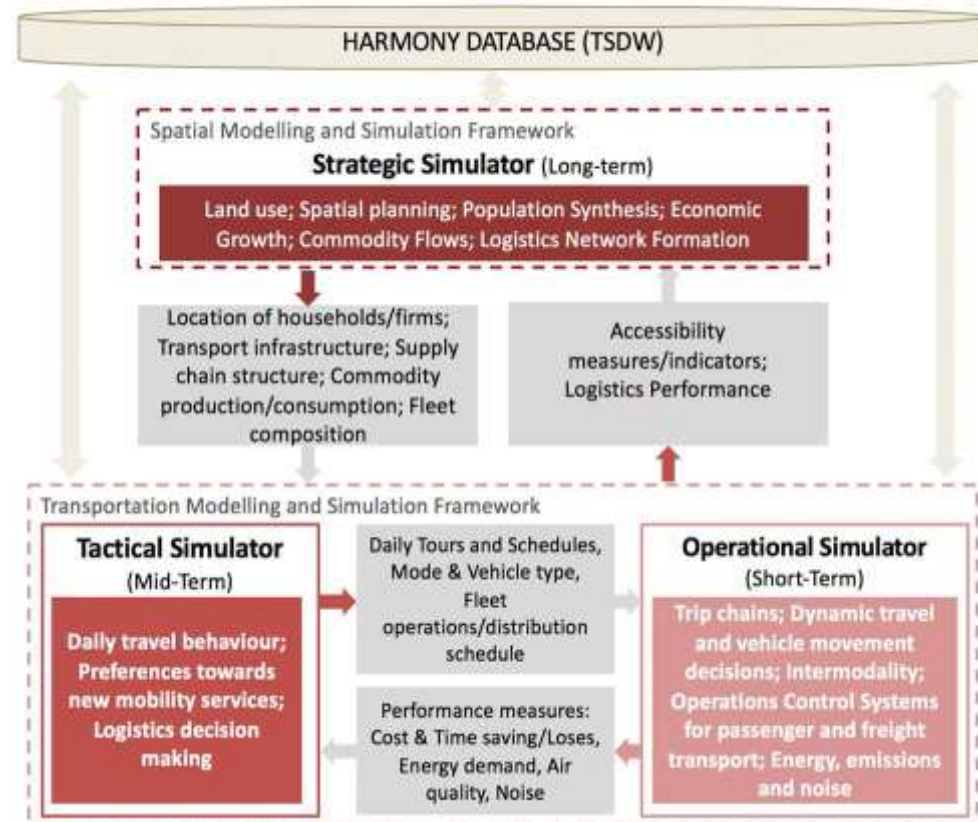
Multi-scale, software-agnostic, integrated activity-based model system.

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.





Overall architecture

Web-based interface

User can choose which transport interventions to compare on a concrete setting (supply, demand)



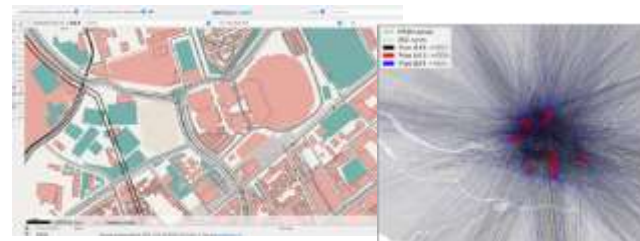
Platform core

Upon a user's request, runs a specific workflow that consists of one or more simulators/models



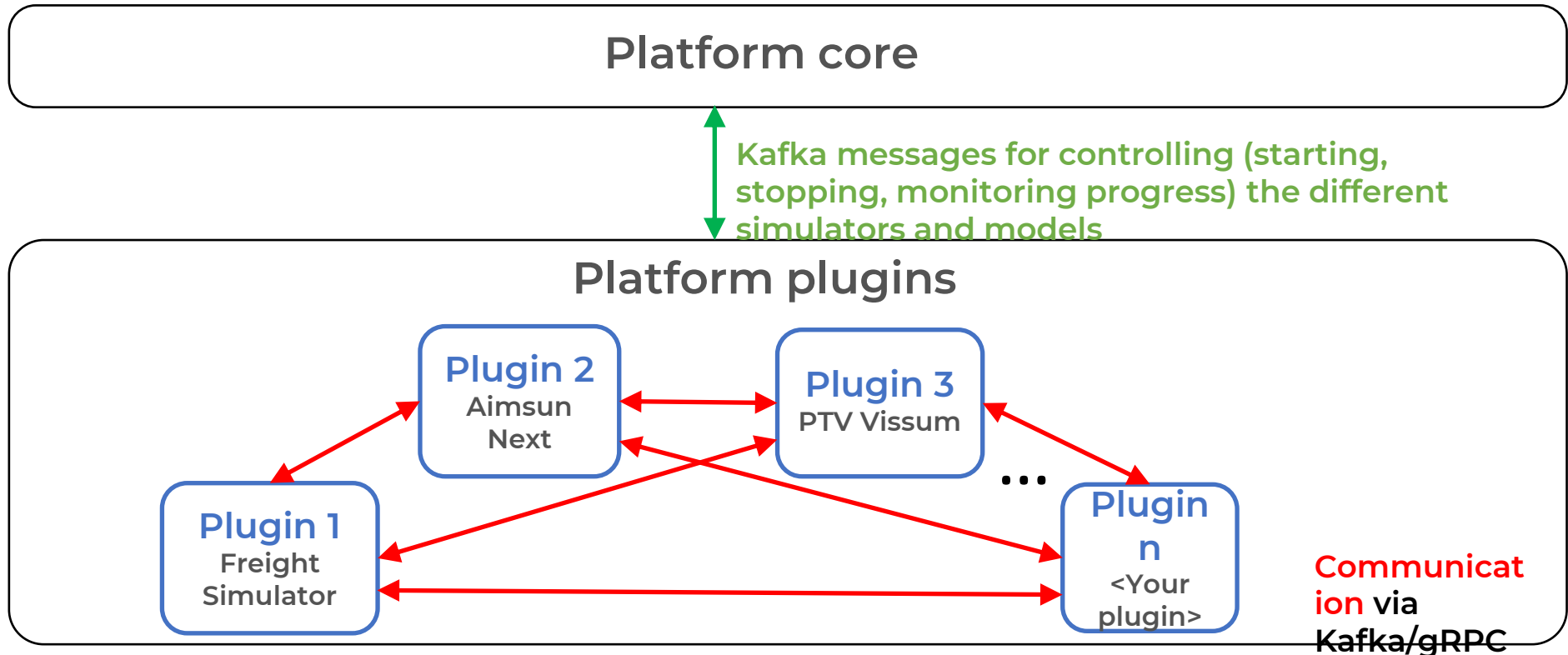
Platform plugins

Simulators and models that can be plugged in to the platform and used in workflows





Communication between core and plugins



Each plugin:

- needs to be able to communicate with the platform core via a number of messages
- can be written in any programming language/environment
- can be and be open or closed source



Innovation

**Flexible integration
of new simulators
and models**

Users can leverage already integrated simulators, plug in their models + extend the capabilities of the platform

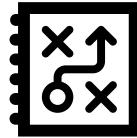
**Management of data,
algorithms, and tools
for policy making**

Users can use a single platform for running their experiments, compare results and store analysis data for further analysis

**Efficient, reproducible
experiments and
what-if analyses**

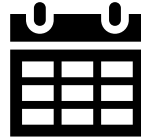
Users can browse through the results of similar experiments in other cities, reproduce results, and perform several what-if analyses

Diagnostic and Prognostic Tool - Indicative KPIs Strategic Simulator



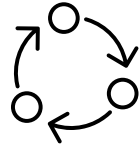
- Employment by sector,
- Average income per person,
- Population projections,
- People flows,
- Employment distribution,
- Population distribution,
- Number of vehicles per household,
- Total number of firms,
- Number of bicycles per household,
- Average age of regional vehicle fleet,
- Accessibility (green spaces),
- Vehicle fleet size,
- Number of vehicles by emissions category
-

Diagnostic and Prognostic Tool - Indicative KPIs Tactical Simulator



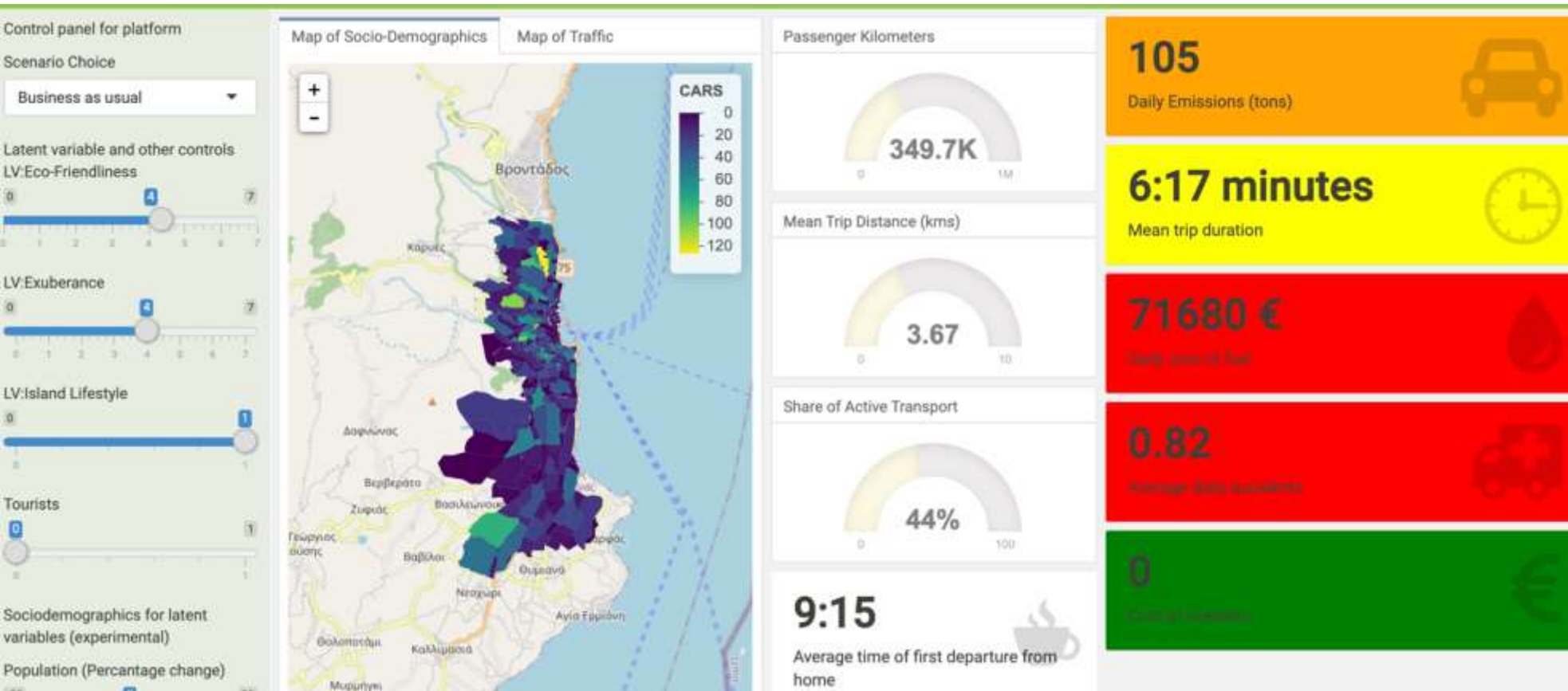
- | | | | |
|------------------|--|----------------|--|
| <u>Passenger</u> | <ul style="list-style-type: none">• Household/individual daily trips• Household/individual daily activities (per type)• Household/individual daily kms travelled• Time usage• Accessibility to public transport services• Demand/modal split for future services or modes• PT demand originating from MaaS subscribers | <u>Freight</u> | <ul style="list-style-type: none">• Production of shipments per logistics segments• Consumption of shipments per logistics segments• Nr of trips per flow type• Average load carried in trip by vehicle type• Emissions by vehicle type• Emissions by municipality (or other zonal aggregation) |
|------------------|--|----------------|--|

Diagnostic and Prognostic Tool - Indicative KPIs Operational Simulator



- Total trips per vehicle
- Parcels delivered
- Total distance travelled
- Total cost of trip
- Pollutant emissions
- Vehicle used capacity
- Number of incidents
- Delay time (total)
- Flow (total)
- Input flow (total)
- Max virtual queue (total)
- Mean virtual queue (total)
- Speed (total)
- Total distanced travelled (total)
- Travel time (total)
- Total trips delayed
- Total cost of trip

Diagnostic and Prognostic Tool – Dashboard – Initial Prototyping



User interaction/controls
(for additional input or interaction
with specific variables/scenarios)

Map or other screen

Various approaches to presenting results/KPIs
(Graphs, charts, icons, colorscales, etc.)



The HARMONY MS will be available to the market in mid-2023.

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[https://harmony-
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www.harmony-h2020.eu



Harmony-H2020



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