

Modelling long-distance travel and e-commerce as add-ons to an urban land use and transport interaction model

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Long-distance travel and urban freight transport are responsible for a significant share of the greenhouse gas emissions of urban populations. Long-distance trips account for a small share of total trips but for a high share of distance travelled, energy consumed and pollutants emitted. E.g. long-distance travel by British residents accounts only for about 3 % of their mechanised trips but for nearly a third of all distance travelled. About 10-15% of the urban road traffic are freight traffic. An increasing share are B2C parcel deliveries triggered by the growing e-commerce sector. However, operational urban transport models typically cover only short distance, everyday mobility.

A System Dynamics based model of long-distance travel in Europe named LUNA (Simulating the demand for Long-distance travel Using a Non-OD -matrix based Approach) was developed in the EU funded research project ORIGAMI (Optimal Regulation and Infrastructure for Ground, Air and Maritime Interfaces). LUNA was implemented as a hybrid model with a trip generation and elasticity based approach to factors such as income with distance classes for long-distance trips by mode across the EU determined as tours. It includes door-to-door costs including access/egress legs and is a tool being both transparent and relatively low cost with good policy sensitivity.

A System Dynamics based model of the transport and environmental effects of e-commerce in the city of Vienna was developed in the national project URANOS (Environmental effects and resource consumption of B2C e-commerce in Vienna). It includes sub-models for customer trips to shops and collection points and CEP mileage (courier, express, parcel).

The proposed oral presentation outlines a concept to use the abovementioned models as add-ons to the integrated land use and transport interaction model MARS (Metropolitan Activity Relocation Simulator). Applicability and benefits of this approach will be demonstrated using the case study of the metropolitan region Vienna.