MAKING A GREAT PLACE

Metro

Modeling Services

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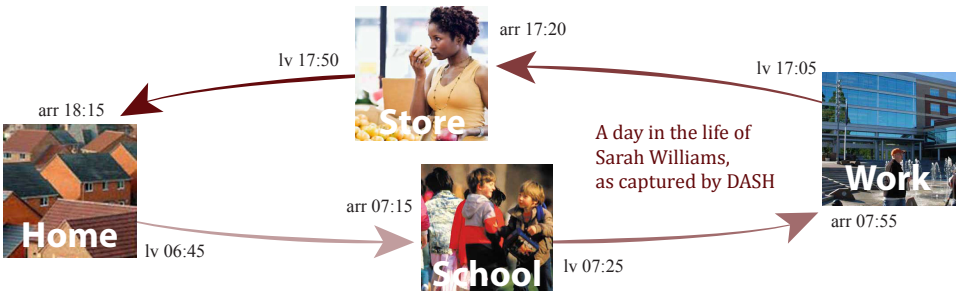
Research Center updates

Dynamic Activity Simulator for Households



What's new?

The Dynamic Activity Simulator for Households (DASH) is the state-of-the-art activity-based model being developed for Modeling Services. DASH offers significantly enhanced functionality relative to its trip-based predecessor and will be used extensively in estimating daily activity plans and individual traveler responses to policies and infrastructure investments.

How does it work?

DASH begins by creating a synthetic regional population composed of individuals situated within households. This is followed by a long-term choice module that forecasts workplace location, school location and household auto ownership.

Next, DASH generates an initial set of typical weekday activity plans for each simulated individual. These plans are generated as a function of the roles of individuals within households (e.g. adult/child, working/not working, parent/no children), intra-household dependencies (e.g. carpooling, parents dropping kids off at school), and availability of vehicles throughout the day. Certain "maintenance" activities are scheduled (e.g. work, medical appointments), while discretionary activities are more flexible (e.g. grocery shopping).

DASH then simulates the activities and movements of each individual in five-minute increments throughout the day. At each interval, individuals can choose to continue their current activity or transition to a new one at a different location. These decisions are constrained by the factors described above and informed by time-dependent probabilities as well as travel times and costs associated with available modes. As the day progresses, person agendas may be modified in response to changing conditions (e.g. traffic congestion). At the end of the simulated day, the entirety of each individual's activity pattern and travel is logged and expressed in the form of a tour (e.g. home-shop-work-home).

Why does it matter?

DASH is designed to more effectively address contemporary policy issues that are increasingly beyond the scope of the previous generation of transportation models. Key advances that facilitate these enhanced capabilities include DASH's focus on the individual, its handling of time in the form of a continuous "internal clock," and its ability to account for the roles of individuals and intra-household travel dependencies.

With these features in place, many potential reactions to stimuli can be simulated and a wide range of analysis conducted. Pursuant to the simulation of a given policy, DASH will estimate numerous travel response mechanisms such as modified activity plans, adjusted departure times, and changes in preferred modes. Detailed information on individuals and the households to which they belong makes it possible to perform equity analysis accounting for specific market groups (e.g. income level, age, transit dependency). Since individual travelers have socio-economic roles with unique values of time, more accurate and detailed reactions to tolls and other pricing regimes can be gauged.