

Elaine Murakami, Federal Highway Administration

## **Bio**

Elaine Murakami is a Community Planner with the Federal Highway Administration's Office of Planning in Washington, D.C. She lives in Seattle, WA. Previous to her job at FHWA, she worked at the Puget Sound Region Council, the MPO for the Seattle area. She was instrumental in the 1996 Lexington, KY GPS pilot study that used Sony MagicLink handheld touchscreen computers along with magnetic mount GPS units for a 6-day vehicle survey (<http://www.fhwa.dot.gov/ohim/lextrav.pdf>). She has contributed toward other innovations in travel and activity surveys including the integration of web-based GIS (<http://www.fhwa.dot.gov/ohim/trb/sbir/sbir.htm>), and implementing a longitudinal travel survey (the Puget Sound Transportation Panel).

## **Position Statement**

**TITLE:** Bringing Geographers and Travel Demand/Activity Modelers together to Benefit from new GPS travel data resources.

Self-reported travel and activity surveys have been the standard approach used by transportation survey researchers over the last fifty years to capture daily travel behavior used in travel demand forecasting. Data collection methods have shifted from in-home interviews to telephone interviews and mail-back survey forms. The goals for these surveys have likewise shifted, with early surveys in the 1950's and 1960's with samples of 5 percent of households in a region, to provide origin/destination matrices. More recent surveys have been in the range of 2,000 to 15,000 households for a region for a 1-day travel diary, with stratification of households by number of vehicles and number of persons in the household or number of workers in the household, with the objective of capturing trip rates by purpose, trip length distributions, and vehicle miles of travel. While sample stratification may have had a geographic component in recent surveys, e.g. quotas for specific political boundaries, or quotas for areas near transit service, the geographic distribution of trips became of less importance in these regionally conducted surveys over the past 30 years.

Using GPS may allow for further reductions in sample sizes for travel behavior surveys, but with longer data collection periods. A GPS-based survey reintroduces the concept of spatial analysis to household travel/activity surveys. The benefits of having longer data collection periods may outweigh the losses in sample size. In particular, there are at least two FHWA value pricing projects where GPS is being used for analyzing private vehicle travel behavior for "before" and "after" conditions. The Commute Atlanta data includes 365 days of "before" data, and the Puget Sound project includes 60 days of "before" data.

Some of the benefits of these long data collection periods using GPS include:

1. Ability to capture a "truer" picture of the spatial range of a person's travel

2. Ability to examine variability/stability of travel behavior over a time period such as a week or a month.
3. Ability to examine relatively infrequently made trips, e.g. those over 50 miles.

The majority of daily trips in the United States occur in private vehicles (87 percent),<sup>1</sup> therefore using GPS to capture the majority of travel can result in more complete (fewer errors of omission), and more accurate (time, distance) information, and provide details heretofore unavailable using self-reported methods (speed, route choice).

Research in Japan has used GPS-enabled cell phones for tracking personal travel, not limited to vehicles. Recent work in the United States to develop GPS-enabled personal tracking devices has been hindered by battery weight that increase the burden of completing the survey, and lags in 3G telecommunication services for mobile phones.

GPS surveys may be a better source than traditional travel behavior surveys for microsimulation of travel behavior because they can be directly linked to network characteristics. For example, because the route choice can be determined, use of different types of roadways (local vs. arterials vs. highways), use or avoidance of left turning lanes, use or avoidance of signalized intersections, can be incorporated into the simulation algorithms. Similarly, if detailed parcel-based land use information is available, it can also be incorporated into microsimulation algorithms.

However, there is a need for spatial analysis tools and trained analysts who can access, process, and analyze the wealth of GPS data either now available, or will be available very shortly. The transportation community can benefit from existing work in geography, but geographers must understand what applications are desired by transportation modelers. GIS statistical software is becoming more robust. This meeting will help bridge the two communities, and can establish some shared interests and efforts in the near future.

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<sup>1</sup> "Highlights of the 2001 National Household Travel Survey" BTS-03-05, Bureau of Transportation Statistics, U.S. DOT, Washington, D.C. 2003