



## The Exploratory Advanced Research Program Fact Sheet

# Designing a New National Household Travel Survey

## Innovations in Collecting and Analyzing Long-Distance Travel Information

Exploratory Advanced Research . . . Next Generation Transportation Solutions



**T**he Federal Highway Administration (FHWA) is seeking new approaches to the design of the next national long-distance travel study—advanced methods of capturing and analyzing travel data to support effective, defensible transportation decisionmaking. To further that search, the FHWA Exploratory Advanced Research (EAR) Program has funded the study “Design of a Completely New Approach for a National Household Travel Survey Instrument,” which is being conducted by Battelle, teamed with the Urban Institute and the University of Maryland.

### Establishing Research Goals and Objectives for the Survey

This EAR Program project encompasses multiple studies to examine different aspects of collecting and analyzing long-distance travel data. Recent trends, including the shift to wireless communications, reduced funding for conducting surveys, declining survey response rates, and sampling inefficiencies, have created significant challenges for traditional survey methods. New technologies and evolving survey methodologies, on the other hand, offer potential for improving travel survey results. The project’s initial task was to draft a set of research goals and objectives for studying long-distance travel. First, a broad statement of research goals was formulated:

The long-distance travel study seeks information about travel of people living in the United States involving trips of 50 miles or more one way. The data are to be used in planning the U.S. transportation

system locally and nationally, for developing travel demand models for forecasting, to assess investment alternatives for transportation-related infrastructure, and to examine how legislation and regulations affect the broader transportation system and its utilization.

Because specific research objectives depend on anticipated funding levels, the study has proposed specific research objectives under each of three distinct funding levels.

### Exploring Candidate Approaches to Survey Design

In a series of studies, researchers assessed several features of survey design relative to their usefulness in characterizing the long-distance travel behavior of the Nation’s households.

*Integrating New and Existing Surveys*—“Piggybacking” strategies are ideal for realizing cost efficiencies and maximizing the information obtained from a sample size. This study noted examples of existing surveys that would be best suited for integration with a long-distance travel survey and assessed the benefits and limitations of such integration.

*Designing a Core Probabilistic Sample*—Researchers examined microdata from the 1995 American Travel Survey and the 2001 National Household Travel Survey to identify demographic patterns of long-distance travelers for effective stratification and efficient screening of households and to determine an appropriate retention period for gathering information on the long-distance trips of household residents.

*Fusing Probabilistic and Nonprobabilistic Data*—A series of mathematical simulations, using data from the 1995 American Travel Survey, were performed to assess whether combining trip data from a core probabilistic sample with data obtained by nonprobabilistic means (e.g., an opt-in panel) can lead to improved precision on travel parameter estimates. The data fusion concept is a novel alternative when the cost of achieving the



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necessary sample size for a probabilistic-based national survey exceeds available resources.

*Modeling Methods for Imputing Trip Information*—While advanced travel survey methods (e.g., GPS, smartphone, social media) can provide temporal-spatial information on travel more accurately than the recall techniques used in traditional surveys, the newer methods cannot provide all necessary trip information, such as trip purpose. Researchers derived a set of post-processing methods (based on machine learning techniques) for estimating trip purpose, and validated these methods.

*Developing Applications for Trip Detection and Data Capture*—To facilitate passive data collection on long-distance travel surveys while minimizing trip recall bias, researchers developed and tested applications for iPhone® and Facebook® users that have the potential to improve data quality and response rates. The iPhone application periodically checks the distance between the user's home and the iPhone and, when this distance exceeds the 50-mile threshold, prompts the participant to take a short survey regarding the trip. The Facebook application mines and analyzes information on the user's Facebook page to detect when the user is on or has recently completed a long-distance trip and then prompts the participant to take a trip-related survey.

### Designing a New Survey

The project will culminate in a proof-of-concept pilot survey and the development of a set of recommendations for the design of FHWA's next long-distance travel survey. The small pilot will demonstrate the feasibility of various techniques and methods examined in this exploratory research. The research will lead to more efficient data collection, reduced respondent burden and need for recall of past events, and the ability to collect data of sufficient quality within a reduced budget.

### EXPLORATORY ADVANCED RESEARCH



#### What Is the Exploratory Advanced Research Program?

FHWA's Exploratory Advanced Research (EAR) Program focuses on long-term, high-risk research with a high payoff potential. The program addresses underlying gaps faced by applied highway research programs, anticipates emerging issues with national implications, and reflects broad transportation industry goals and objectives.

To learn more about the EAR Program, visit the Exploratory Advanced Research Web site at [www.fhwa.dot.gov/advancedresearch](http://www.fhwa.dot.gov/advancedresearch). The site features information on research solicitations, updates on ongoing research, links to published materials, summaries of past EAR Program events, and details on upcoming events. For additional information, contact David Kuehn at FHWA, 202-493-3414 (email: [david.kuehn@dot.gov](mailto:david.kuehn@dot.gov)), or Terry Halkyard at FHWA, 202-493-3467 (email: [terry.halkyard@dot.gov](mailto:terry.halkyard@dot.gov)).

#### Learn More

For more information on this EAR Program project, contact Patrick Zhang, FHWA Office of Highway Policy Information, at 202-366-1941 (email: [patrick.zhang@dot.gov](mailto:patrick.zhang@dot.gov)).

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