

Transportation Secure Data Center

Real-World Data for Planning, Modeling & Analysis

Meeting the Growing Demand for Transportation Data

In ever-increasing numbers, members of the public and private sector are mining data and leveraging existing research to improve the credibility of studies, generate models and create new tools for consumers. To meet this growing demand while safeguarding sensitive information, the National Renewable Energy Laboratory (NREL) and the U.S. Department of Transportation (DOT) have launched the Transportation Secure Data Center (TSDC).

The TSDC (www.nrel.gov/vehiclesandfuels/secure_transportation_data.html) preserves respondent anonymity while making vital transportation data available to a broad group of users through secure, controlled access. This repository includes data sets collected by planning agencies from the federal to the municipal level, and supports researcher efforts to build accurate and reliable real-world models.

Valuable to Planners, Researchers and Manufacturers

In many cases, individual data collection and analysis projects can cost millions of dollars. As the TSDC database grows, metropolitan planning organizations, universities, national laboratories, air quality management districts, disaster planning agencies and auto manufacturers will all find material valuable to their efforts. This data can be used for:

- Transit planning
- Travel demand modeling
- Congestion mitigation research
- Emissions and air pollution modeling
- Vehicle energy and power analysis
- Climate change impact studies
- Homeland Security evacuation planning
- Alternative fuel station planning
- Validating transportation data from other sources



Altogether, TSDC users can find millions of data points from thousands of vehicles, hundreds of which contributed data for more than a year. NREL screens data for missing values and adds metadata to assure quality and supply context. Summary statistics provide an overview of each data set and highlight differences between them.

Two Levels of Clearance

Transportation data can present particular confidentiality challenges, because global positioning system (GPS) information makes it possible to identify an individual from an "anonymous" data set. While detailed geographic and time/speed resolution make the data extremely valuable, associated privacy concerns often discourage collecting agencies from sharing it with other researchers. The TSDC's two levels of access make composite data available with simple online registration, and allow researchers to use detailed spatial data after completing a more rigorous clearance process.

In addition to system design and maintenance, NREL is responsible for scrubbing raw data, removing any confidential information so it can be used by a wider group. The resulting cleansed data, which includes high-level summary statistics, vehicle and participant demographic information, and second-by-second speed profiles (with latitude/longitude detail removed), is freely available for download.

Detailed spatial data is made available through a secure web portal to interested researchers after completing an application process. Users are prohibited from transferring raw data out of the secure environment, but they are able to generate aggregated results. Software tools are also available for database querying, geographic information system (GIS) visualization and statistical analysis. Reference information, such as the underlying road network, demographic and economic grid data, helps support GIS analyses.

Strictly controlled access, secure storage and the support of NREL's legal and cyber security offices provide additional safeguards for this data.

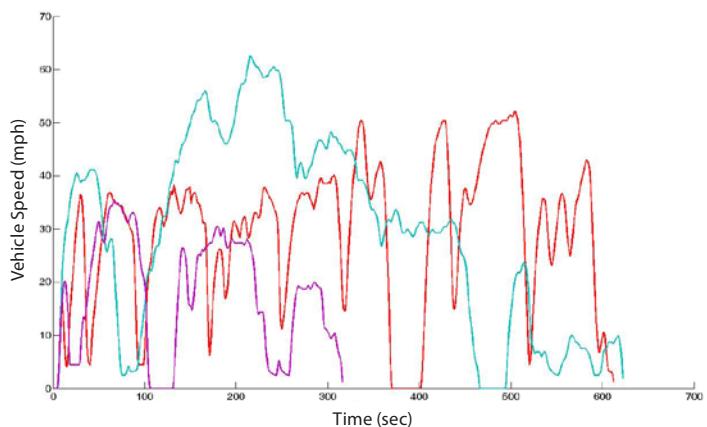
Secure Data Track Record

The TSDC builds on NREL's extensive experience with GPS data collection and analysis, secure data storage/processing and information sharing. Since 2003, the laboratory has hosted the Hydrogen Secure Data Center (HSDC) for the U.S. Department of Energy (DOE) to support collection and aggregation of proprietary manufacturer data on fuel cell vehicles and hydrogen infrastructure.

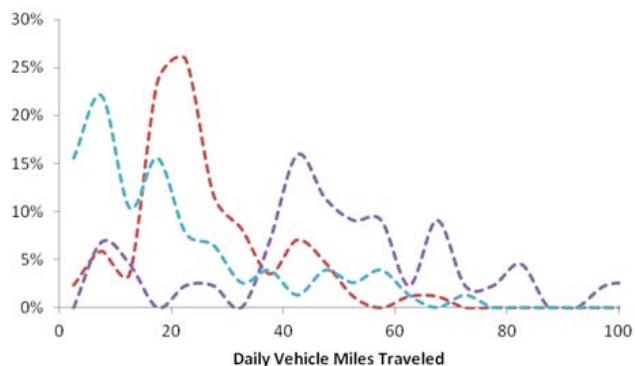
In addition to its in-house experts, NREL has assembled an advisory committee to guide design and operation of the TSDC. The advisory group and other consulted stakeholders include the DOT; municipal and state planning agencies; universities; the U.S. Environmental Protection Agency and air quality management districts; the DOE and other national labs; auto manufacturers; and other research and regulatory entities.

NREL continues to build TSDC data sets. To discuss options for joining NREL as a partner in the TSDC, to apply for spatial data clearance, or for more information on the project, contact NREL's Jeff Gonder at (303) 275-4462 or Jeff.Gonder@nrel.gov; or the DOT's Elaine Murakami at Elaine.Murakami@dot.gov.

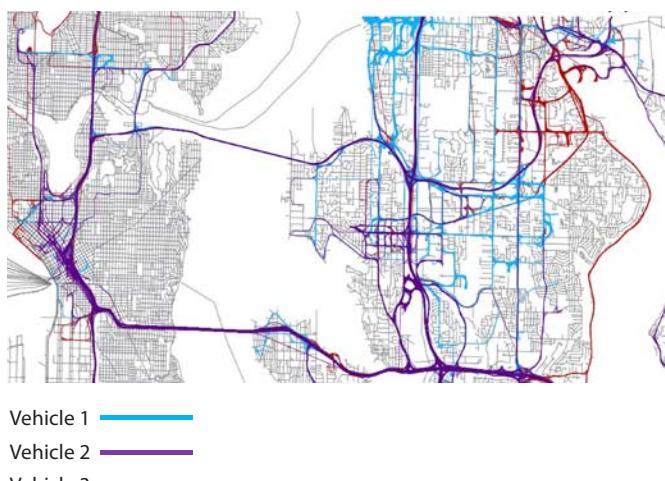
Vehicle Speed vs. Time



Probability of Distance Traveled by Vehicles 1, 2 & 3



All Trips for Vehicles 1, 2 & 3



Top and Middle: Analyses conducted with cleansed data from the TSDC.
Bottom: Analyses conducted with spatial data from the TSDC controlled-access area. Source: NREL/TSDC



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