NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Transportation Secure Data Center

Real-World Data for Planning, Modeling and Analysis

www.nrel.gov/tsdc

Meeting the Growing Demand for Transportation Data

To resolve the inherent conflict between preserving survey respondent privacy and making vital transportation data more broadly available, the National Renewable Energy Laboratory (NREL) and the U.S. Department of Transportation (DOT) have launched the free, web-based Transportation Secure Data Center (TSDC). Unlike other sensitive data archives to which users must physically travel, TSDC users may access microdata through a secure online connection from the comfort of their own desks after completing a simple application process.

Data Available through the TSDC

The repository includes data from value pricing/tolling and travel surveys collected from the municipal to federal level using global positioning system (GPS) devices.

Sample Data Sets

Data Source	Date(s) Collected	Vehicles	Vehicle Days	Study Length
Atlanta Regional Commission Travel Survey*	2011	1,653	8,589	7 days
Chicago Regional Household Travel Inventory *	2007	408	1,773	7 days
Puget Sound Regional Council Traffic Choices Study	2004-2006	484	145,273	18 months
Southern California Association of Governments Regional Travel Survey	2001-2002	624	1,208	2 days
Texas Department of Transportation Travel Surveys from Austin, Houston, San Antonio and many other cities	2002-2011	3,404	5,258	1-2 days

*Also includes a wearable GPS component to capture other travel modes.

Valuable to Planners, Researchers and Manufacturers

Individual data collection and analysis projects can cost millions of dollars, so using the results for multiple transportation applications can enable more effective use of limited public funds. The TSDC database gives metropolitan planning organizations, universities, national laboratories, air quality management districts, disaster planning agencies and auto manufacturers free-of-charge web-based access to valuable transportation data. 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
- Toll and pricing research

The millions of data points available through the TSDC include second-by-second GPS readings from many studies. NREL screens the data for missing values and adds metadata to assure quality and supply context.

Two Levels of Clearance

While the detailed geographic and time/speed resolution makes GPS data extremely valuable, associated privacy concerns often discourage collecting agencies from sharing it with other researchers. The TSDC's two-level access makes this data available while maintaining participant anonymity.

Cleansed data is readily available for download from the web site. NREL scrubs raw data, removing any confidential information so it can be used by a wider group. This publicly-downloadable data includes high-level summary statistics, vehicle and participant demographic information, and second-by-second speed profiles (with latitude/longitude detail removed).

Detailed spatial data is made available online through a secure web portal. After completing a simple application and obtaining approval, researchers may access the GPS data files. Users are prohibited from copying or transferring raw data out of the secure environment, but they are able to conduct statistical and

geographic analyses from the microdata records, and generate aggregated results for removal from the secure environment. The following table lists examples of features available in the environment, and users may import additional software tools and reference data as needed.

Included Features	Provided Tools/Reference Files
Database Querying	pgAdmin/PostgreSQL
Statistical Analysis	R Python(x,y)
GIS Visualization	ArcGIS QGIS uDig
Demographic, Economic and Land Use Data Layers at Various Summary Levels	UrbanSIM Census 2010 American Community Survey (ACS)

Reference information, such as the underlying road network, demographic and economic grid data, helps support geographic information system (GIS) analyses.

Controlled access, secure storage and the support of NREL's legal and cyber security offices provide additional safeguards for this data. For more information on how to apply for online access to secured TSDC data, visit the TSDC website (www.nrel.gov/tsdc) or contact Jeff Gonder at (303) 275-4462 or Jeff.Gonder@nrel.gov.

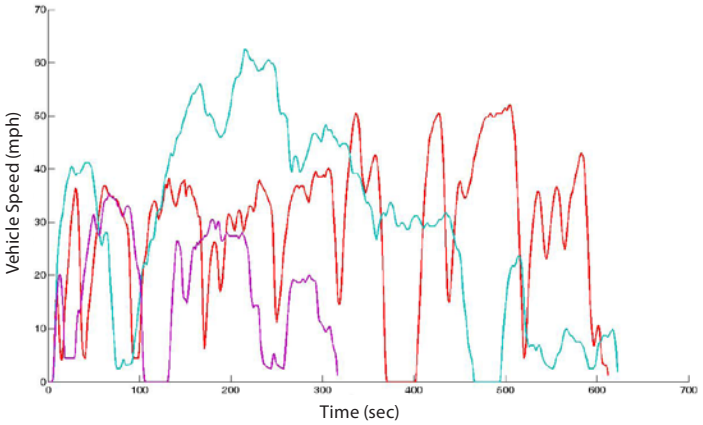
Secure Data Track Record

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 for the U.S. Department of Energy (DOE) to support collection and aggregation of proprietary manufacturer data on fuel cell vehicles and hydrogen infrastructure.

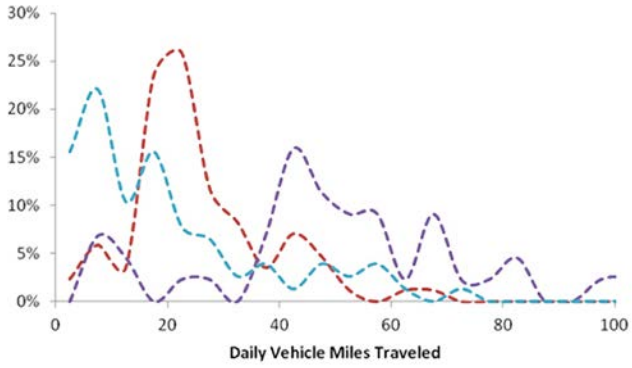
The TSDC advisory group and other consulted stakeholders include the DOT; municipal and state planning agencies; universities; the U.S. Environmental Protection Agency and air quality management districts; the DOE and other national labs; auto manufacturers; and other research and regulatory entities.

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

Vehicle 1
Vehicle 2
Vehicle 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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