







TECHNOLOGY PERFORMANCE VALIDATION AND VEHICLE DATA ACQUISITION

NWT services in performance evaluations of new technology include:

- Real-world vehicle operational and route data collection and analysis
- Development of fleet-specific drive cycles for more representative test validations compared to standard drive cycles
- Insight for determining routes and regions to identify best business cases for advanced vehicle technologies
- Baseline data collection for assessment of applications or vocations

The NWT approach to vehicle performance evaluations

- Establishing comprehensive data collection and testing protocols for supporting client-specific requirements.
- Collecting and analyzing real-world vehicle operational and route data from heavy- and light-duty vehicles through track, dynamometer, and long-term field testing.
- Providing insight from data analyses to better understand fleet operation and determine which routes/regions would be most economical for new technologies such as hybrid powertrains.
- Developing an understanding of fleet routes, regions, and usage characteristics to accurately evaluate the potential benefits of new technologies and vehicles.
- Defining fleet-specific drive cycles based on data collected that can be used to provide more accurate test validations compared to commonly used drive cycles.
- Tailoring each project to client-specific needs, with the data processed, analyzed, and provided in the format requested.

How NWT conducts vehicle data acquisition

- Vehicle data is collected using a rugged field datalogger computer and a wireless broadband modem.
- The primary data source is the vehicle controller area network (CAN) bus, where all available parameters can be monitored and recorded. Additional inputs such as global positioning system (GPS) sensors, inclinometer sensors, pressure sensors, thermocouples, and digital signals can also be captured.

New West Technologies, LLC (NWT) is a technical consulting firm with over 30 years of focused experience in the transportation and energy sectors.

- Alternative Fuel and Advanced Vehicle Technology Performance Validation
- Fleet Evaluation for Efficiency and Technology Strategies
- Technology Road Mapping and Market Assessments
- Legislative and Regulatory Analysis
- Project Management and Public Funding Support

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- For remote test monitoring and to assist with diagnosing vehicle issues in the field, the broadband cellular modem provides real-time access to the datalogger, test setup, and operational data.
- Through a seamless automated transmission process, data is uploaded wirelessly from the vehicle datalogger to NWT offices for quality control and analysis.
- The datalogger system installation and removal can be completed during off-hours to not interfere with the fleet's mission.

Examples of vehicle acquisition information reports

- Real-world data inputs for vehicle simulation models
- Daily route summaries for route planners
- Periodic performance updates to technical or non-technical audiences
- Vehicle usage characteristics by region
- Specialized dynamometer duty cycle development
- Evaluation of long-term vehicle performance and use, such as:
  - Average fuel consumption
  - Time spent on route, at highway speeds, idle, or in non-value added roles (i.e., transit to job site)
  - Vehicle uptime (reliability, mean time between failure, mean distance between failure)
- Evaluation of advanced technology demonstration vehicles (e.g., hybrid, when a baseline vehicle is also instrumented)
- Information and summaries posted to websites for internal or public viewing

Examples of NWT testing and evaluation applications:

Hybrid Vehicles:

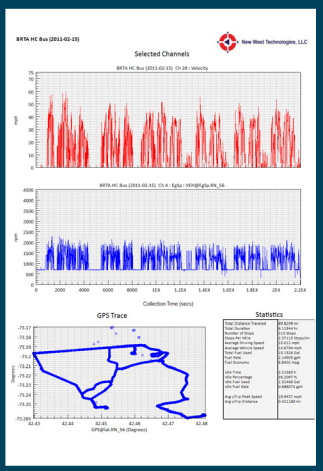
- Hydraulic hybrid refuse trucks (4 total; 3 rear-loaders and, 1 automated side-loader [ASL])
- Compressed natural gas [CNG] hydraulic hybrid rear-loader refuse truck
- Hybrid-electric rear-loader refuse truck

Alternative Fuel Vehicles:

- Liquefied Natural Gas ASL refuse trucks (3 total)
- CNG refuse truck
- CNG transit bus (60 ft.)

Conventional Vehicles:

- Diesel refuse trucks (11 total)
- Diesel Type C school bus
- Diesel transit bus (60 ft.)
- Cutaway shuttle bus (3 total; gasoline and diesel)
- 2-ton delivery vans (3 total; diesel)
- Class 6 package delivery van
- Light duty mail delivery vehicle (gasoline and gasoline/E85)
- New York City "black car" taxi (Lincoln Town Car) (gasoline)



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