# TravTime™ in Action

## Case Study: Sandy Springs Corridor Travel Time Study

GeoStats

*Technology for a Mobile World*

Sandy Springs, a suburban city located outside of Atlanta, Georgia, undertook a **signal timing** effort in 2007 to improve traffic congestion over approximately 10 miles of a major artery, Roswell Road (see Figure 1). This roadway serves local businesses, provides access to thousands of residents, and is a parallel facility to a major freeway (GA 400). This corridor experiences a tremendous amount of traffic throughout the day, especially during the PM peak period. Prior to the re-timing effort, delays in the northbound direction were particularly heavy with drivers regularly experiencing an extra 15-30 minutes of delay over the total distance.


Figure 1: Corridor studied (9.4 miles), Sandy Springs, Georgia

GeoStats was contracted by the City of Sandy Springs to quantify delays and to measure the benefits of the signal timing improvements. In May 2006, GeoStats gathered baseline delay information as well as a number of other traffic flow performance measures, and then re-tested the route in May 2007 after the signal timing adjustments were completed. This "before / after study" provided the city with a direct measurement of changes in travel times, stops and delays, traffic flow efficiency, emissions, and fuel consumption. GPS data was collected using GeoStats **GeoLoggers**™ and processed by GeoStats using **TravTime™** 1.2 software.

### Collection Method

The routes were driven using automobiles equipped with GeoLoggers to capture second-by-second speeds and delays. Drivers were assigned north and southbound routes and drove them during the morning and evening peak times, and at midday. **GeoLoggers** simplified the data collection process by removing the need for field calibration when runs started, ended, or when intersections were crossed, freeing drivers to focus on the road. **TravTime** then enabled data analysts and project managers to replay the exact routes driven in a map environment (see Figure 2).

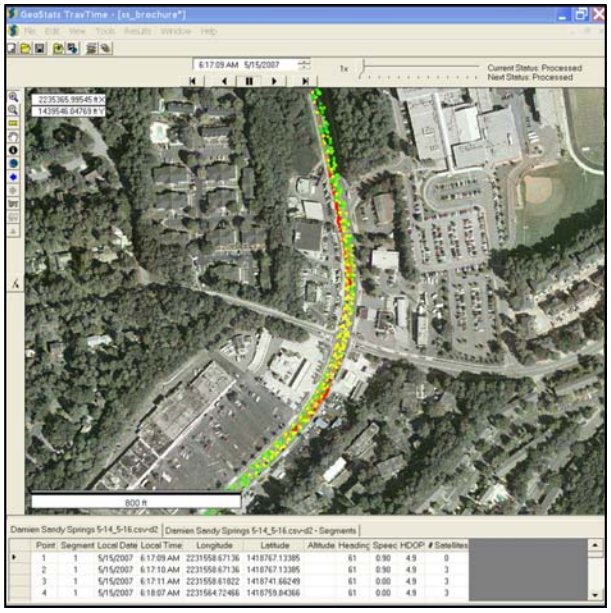
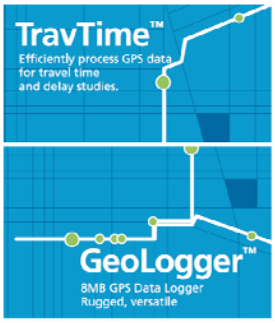


Figure 2: GPS data shown in GeoStats' TravTime

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## Analysis Methods

The client defined the route of the study corridor in the **TravTime** interface, using GIS shape files and aerial photos. This involved marking the route's beginning and ending points, and key intersections or checkpoints. After loading the raw GPS data into **TravTime**, the software segmented the GPS traces at the route endpoints and calculated a wide range of run, route, and intersection summary statistics. **TravTime** allows GPS data to be collected in a single, unified "project," separated into scenarios (e.g., "2006 Test", "2007 Test"). **TravTime** projects enable the client to use the same route definition for both the before and after portions of the study and to share a common set of time frames (e.g., "morning peak", "evening peak", etc.). This simplified the process and helped deliver consistent data analysis and reporting.

### HIGHLIGHTS

- Quantified average delays experienced by drivers
- Quantified impact of roadway signal timing changes
- Identified primary bottlenecks
- Determined average speeds by time period for simulation models

## Results

Using **TravTime**, Sandy Springs was able to prove that their efforts had a positive impact, including significant travel time improvements in both directions over most time periods. Using data computed by **TravTime**, the city was able to measure the improvements in a number of ways — time savings, fuel savings, and emissions reductions due to shorter commute times. Table 1 demonstrates the types of information **TravTime** computes by combining route information and GPS data. Tables 2 and 3 show estimated annual improvements in travel time, number of stops, stopped time, time savings, fuel savings, and emissions reduction during time periods. This information was formally reported to the City Council of Sandy Springs in September 2007.

| Travel Time | Before | After | Change-Min. | Change-% |
|---|---|---|---|---|
| Roswell Rd Northbound | 48.30 | 42.76 | 5.54 | 11% |
| Roswell Rd Southbound | 35.30 | 22.00 | 13.30 | 38% |
| **Number of Stops** | **Before** | **After** | **Change-# Stops** | **Change-%** |
| Roswell Rd Northbound | 61.00 | 47.50 | 13.50 | 22% |
| Roswell Rd Southbound | 30.00 | 9.70 | 20.30 | 68% |
| **Stop Time** | **Before** | **After** | **Change-Min.** | **Change-%** |
| Roswell Rd Northbound | 26.80 | 19.90 | 6.90 | 26% |
| Roswell Rd Southbound | 15.20 | 5.70 | 9.50 | 63% |

Table 1. Changes in travel time, number of stops and overall stop time during the evening peak time (3:30 pm - 6:30 pm)

| Time and Fuel | Annual Improvement | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Travel Time | | | | Fuel Consumption | | Total |
| Time Period | Average Volume | Veh-Hrs Saved | Number of Stops Eliminated | Reduced Stop Time (min) | Dollars | Gallons Saved | Dollars | Dollars |
| **Northbound** | | | | | | | | |
| AM Peak | 4,000 | 227,000.00 | 20,400,000.00 | 190,000.00 | 2,724,000.00 | 136,200.00 | 408,600.00 | 3,132,600.00 |
| Noon | 7,000 | 107,916.67 | 12,775,000.00 | 75,833.33 | 1,295,000.00 | 64,750.00 | 194,250.00 | 1,489,250.00 |
| PM Peak | 7,200 | 166,200.00 | 24,300,000.00 | 207,000.00 | 1,994,400.00 | 99,720.00 | 299,160.00 | 2,293,560.00 |
| **Southbound** | | | | | | | | |
| AM Peak | 6,000 | -15,500.00 | 1,500,000.00 | -15,000.00 | -186,000.00 | -9,300.00 | -27,900.00 | -213,900.00 |
| Noon | 6,500 | 61,479.17 | 5,850,000.00 | 32,500.00 | 737,750.00 | 36,887.50 | 110,662.50 | 848,412.50 |
| PM Peak | 5,500 | 304,791.67 | 27,912,500.00 | 217,708.33 | 3,657,500.00 | 182,875.00 | 548,625.00 | 4,206,125.00 |
| | | | | | | | **Total** | **$ 11,756,048** |

Table 2. Estimated annual time and fuel savings due to the signal re-timing effort

| Emissions | Annual Improvement | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Time Period | Average Volume | Before CO (kg) | After CO (kg) | Diff CO (kg) | Before NOx (kg) | After NOx (kg) | Diff NOx (kg) | Before VOC (kg) | After VOC (kg) | Diff VOC (kg) |
| **Northbound** | | | | | | | | | | |
| AM Peak | 4,000 | 3,200.00 | 3,200.00 | 0.00 | 440.00 | 440.00 | 0.00 | 470.00 | 470.00 | 0.00 |
| Noon | 7,000 | 5,425.00 | 5,600.00 | -175.00 | 927.50 | 770.00 | 157.50 | 980.00 | 822.50 | 157.50 |
| PM Peak | 7,200 | 17,100.00 | 5,760.00 | 11,340.00 | 1,980.00 | 792.00 | 1,188.00 | 3,060.00 | 846.00 | 2,214.00 |
| **Southbound** | | | | | | | | | | |
| AM Peak | 6,000 | 6,450.00 | 6,450.00 | 0.00 | 855.00 | 855.00 | 0.00 | 975.00 | 975.00 | 0.00 |
| Noon | 6,500 | 5,037.50 | 6,987.50 | -1,950.00 | 698.75 | 926.25 | -227.50 | 698.75 | 1,056.25 | -357.50 |
| PM Peak | 5,500 | 5,225.00 | 5,912.50 | -687.50 | 701.25 | 783.75 | -82.50 | 797.50 | 893.75 | -96.25 |
| | | **CO Reduction (kg):** | | **8,528** | **NOx Reduction (kg):** | | **1,036** | **VOC Reduction (kg):** | | **1,918** |
| | | | | **20.09%** | | | **18.48%** | | | **27.47%** |

Table 3. Estimated annual reduction in emissions due to the signal re-timing effort

*Note: The tables assume that there are 250 work days in a year, vehicle occupancy of 1.2 persons per vehicle, time has a value of $10 per hour, and fuel costs $3.00 per gallon (average price at the time of study). Estimated volumes were generated from the model of the metropolitan Atlanta planning body, the Atlanta Regional Commission (ARC) and were averaged for the entire length of the study area. Fuel consumption was estimated to be .6 gallons per vehicle hour. Emissions estimates were generated from MOBILE 6.0 values using a typical Atlanta fleet mix.*