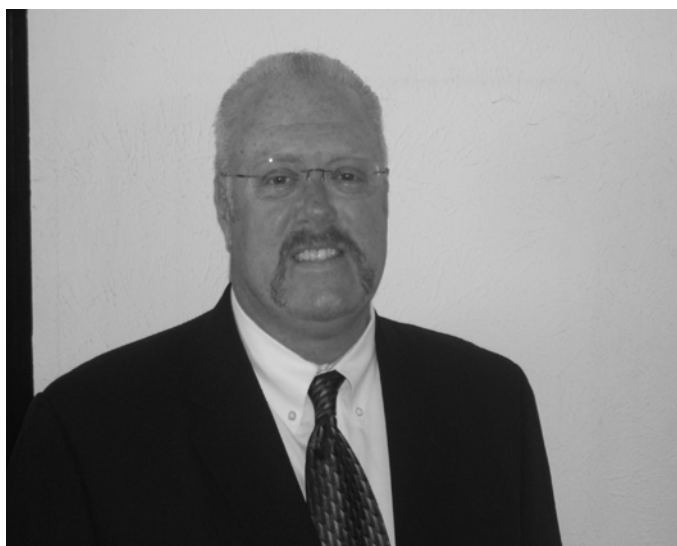# GPS Fleet Tracking Saves Money and the Environment at Adams 12 Five Star Schools

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As a manager of a fleet, there are always proposals on the table for new cost cutting measures. Some of these include fuel switching, infrastructure improvements, route optimization, or the latest fuel additives guaranteed to work miracles. Rarely is there that magic bullet: A cost cutting solution that saves money and has a short payback period. However, with recent technological advances in GPS technology and improved computer networks, it is becoming more evident that GPS Tracking Systems may be a solution which can be used to improve operational efficiencies, reduce idling times, and save money with a short payback period. After implementing a fleet-wide GPS tracking System at Adams 12 Five Star Schools, fleet manager David Anderson has become a strong proponent of the technology and its ability to improve safety and save money.

What is a GPS Tracking System?:

There are many names for these types of systems, but the fundamental idea is the same for most GPS tracking systems. A fleet tracking system includes 4 components:

1. GPS tracking device – This device is installed on the engine of each vehicle and it date-stamps location and possibly engine diagnostics for analysis.

2. Computer software – Software is used to analyze information from the GPS devices regarding vehicle location, vehicle performance, fuel usage, and idling to a central location such as the fleet yard.

3. Telematics – This is a method by which these systems communicate similar to a cell phone network. This is optional. However, with telematics in place, real-time communication can occur between all the vehicles in a fleet and the home base.

4. Analysis and Feedback– When data is collected, analysis of data such as idling times and vehicle performance can be used to change driver behavior and optimize routes.

The Experience at Adams 12 Five Star Schools:

The school bus fleet at Adams County includes approximately 130 buses operating in the winter and 50 buses operating in the summer. In 2009, Fleet Manager David Anderson decided it was time to install a system-wide fleet tracking system.

The product chosen was the Zonar GPS system. To initiate this system, it was necessary to put a GPS Tracking Device on each of the buses, set up a software system at the fleet yard, and then sign up for monthly cell phone service for each of the buses in the fleet. Adams County funded the entire project independently, with the hope that it would pay for itself in a relatively short time frame.

The Adams 12 system includes several innovative features:

- Anti-idling – The GPS system can track how long vehicles are idling, the location of vehicle idles, and the cost of fuel spent on unnecessary idling. "Geofences" were set up at locations such as the fleet yard and adjacent to each of the schools. For purposes of children's health, idling at a school is taken very seriously. Using two-way communication, it is possible to directly notify a driver if there is unnecessary idling within a school district or other area demarcated with a "geofence." Idling reports are also created and provided to supervisors for the purpose of changing driver behavior.

- Pre-and post-trip inspections – These inspections are required as part of operating with a Commercial Drivers License (CDL), but the degree to which these are conducted can vary. Adams 12 uses a hand held device to log Electronic Vehicle Inspection Reports into the software system. This automates the process, reduces paperwork, and ensures consistency between drivers. If there was an accident, there would be documented proof that all drivers had been following CDL regulations.

- Rapid repairs – Necessary repairs used to cost additional time, money, and paperwork. Handheld pre-inspection devices are now connected to the fleet management repair system. Mandatory repairs such as a broken head light recognized during pre-trip inspections are instantly communicated to the repair shop, so repairs can be completed and

This Adams-12 bus is equipped with a Zonar fleet tracking system device and Z Pass student tracking

new replacement parts can be ordered without any paperwork. During operations, if a critical repair is necessary, a replacement bus or repair vehicle can be delivered rapidly to a known location, and other bus routes can be re-routed if necessary.

- Route optimization – Better communication with buses means more logical routes. The system at Adams 12 allows for remote route management. The location, speed, and engine diagnostics for every vehicle in the fleet can be read remotely in real time. If there is a notification of a gas leak, criminal behavior, or closed roads, buses can be instantly notified and a new route can be created to save time. Drivers view routes directly while connected to the system using an off-the-shelf GPS system, and can view hazards and newly proposed routes in real time. This route optimization also allows for alternate scheduling, where nearby schools with staggered start times can be serviced by a single bus. Route optimization also ensures that routes can be created which ensure that vehicles operate efficiently, for example, ensuring that buses get hot enough to regenerate devices such as diesel particulate filters.
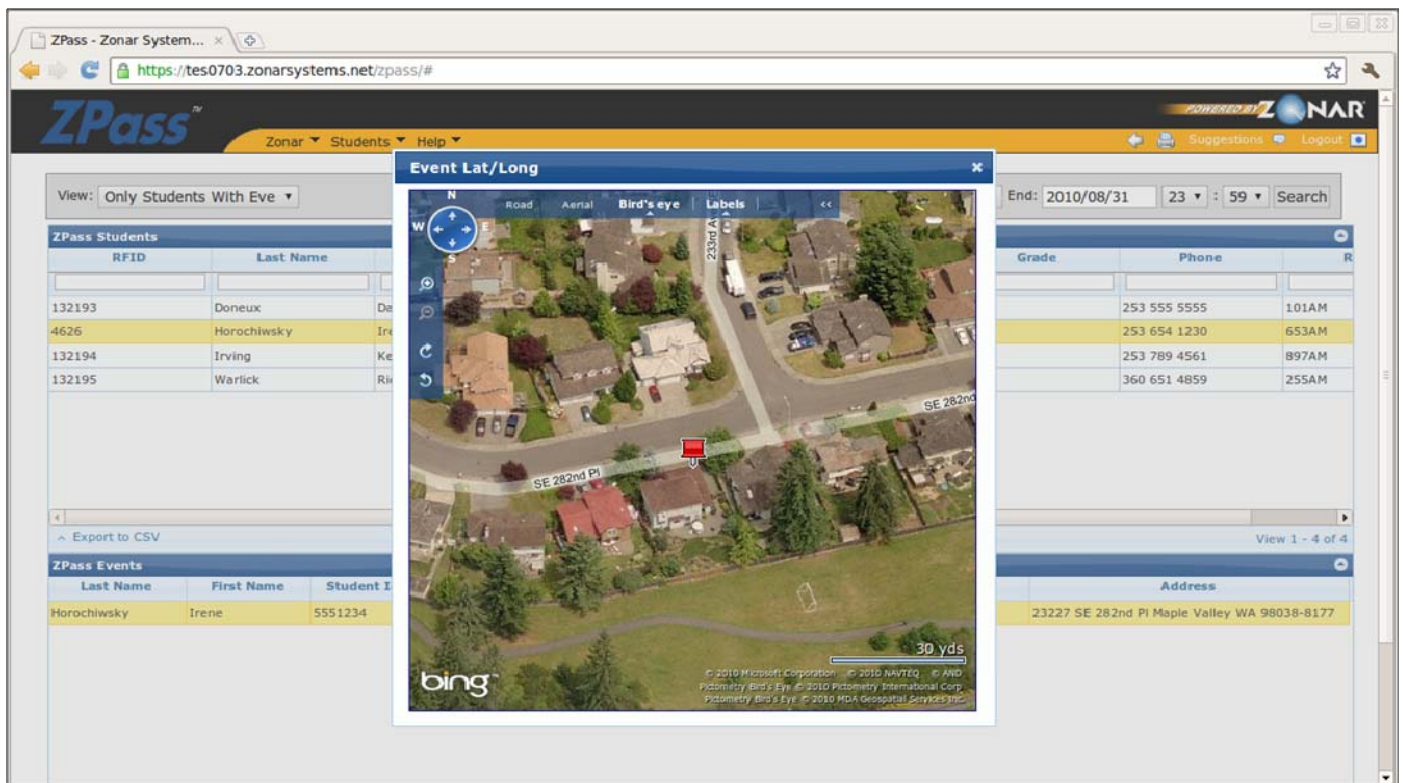
View a map view of exactly where a student entered or exited a bus

- Proven performance – Often times a bus driver could be improperly accused for speeding in a school zone or not being on time at a certain location. With the GPS tracking system, it is possible to determine a driver's location and the driver's exact speeds relative to the posted limit at any time, past or present.   This allows complaints to be followed-up in a very direct and precise manner, and it supports good drivers.

- Student accountability – Adams 12 School District uses the Z Pass System. This allows them to track the location of every student who enters and exits a bus. The school district can then respond to parental or teacher concerns on a student's location rapidly. It is possible to determine where a child was picked up, where they were dropped off, and at what time. It even allows the bus driver to determine if a student is boarding on the wrong bus..

How Much Did this Cost?:

The initial cost for the GPS Tracking System was approximately $600 per bus. Operational fees also include an annual software maintenance fee and a monthly cell phone coverage fee of approximately $17 per bus per month. Installation of the GPS devices was possible in house, as technicians found the process to be "very easy" with new installations completed in 30-40 minutes per bus. Altogether, Adams County spends about $70,000 per year to maintain its fleet tracking system.   This includes GPS tracking devices on the entire city fleet, which encompasses 280-300 vehicles at any given time.

Since the GPS system is considered a "behavior change" technology, it was not possible to obtain Federal grant funding under the Diesel Emissions Reduction Act. Instead, Adams 12 School District funded the project independently anticipating a rapid payback. It is estimated that the system paid off for itself within the first year. Cost savings were most significantly recognized by route optimization, which allows for greater coverage of the overall service area
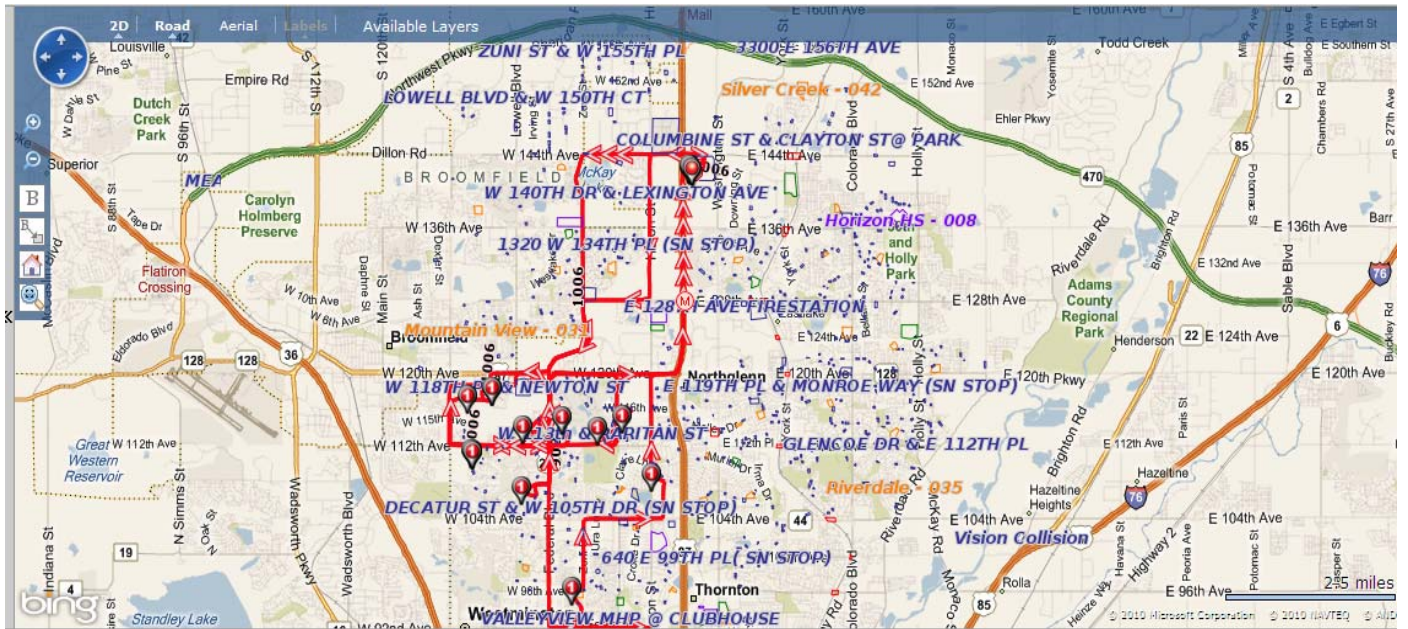
Real-time tracking of location, driver behavior, and environmental performance.

using a smaller fleet. Cost savings initially were also recognized by driver behavior change. Feedback in driver behavior resulted in less fuel consumed during unnecessary idling, rapid acceleration, and higher vehicle speeds. Efficiencies in repairs and paperwork have also provided savings.

Conclusion:

For any new technology, there are reservations and concerns. This may be especially true for a GPS tracking system, where visions of "big brother" could easily affect drivers who feel they are being monitored. However, in Adams County these concerns were put to rest quickly. Feedback from drivers and maintenance technicians has been very positive. Elimination of paperwork for inspections and repairs has been received very well by all involved. Avoiding accidents and traffic through real-time route optimization has also been viewed very positively., and cost savings have been

significant through reduced fuel usage. Drivers are pleased that they cannot be inappropriately accused of missing a pickup or drop off location and/or driving aggressively. Parents can be assured knowing that unnecessary idling is not affecting their children's air quality at schools, and children are being picked up and dropped off at the right location at the right time.

For fleet managers, there are very few technologies which offer savings and environmental performance with a short payback period. Traditional approaches such as diesel retrofits, vehicle replacements, and fuel infrastructure changes can be hard to justify as the timeframe for payback goes beyond the budget cycle. However, at Adams 12 School District, Fleet Manager David Anderson might just be on to something.

Rocky Mountain Clean Diesel Collaborative — www.epa.gov/region8/air/rmcdc