Dude! Where's My Bus?

Telematics takes transportation management to a new level.

By John Lang, III, and Winship Wheatley

What does a word that sounds like the name of a sub-deity from Greek mythology have to do with managing your school bus fleet? Before you answer "nothing," read on.

The word we are talking about is "telematics." (It does sound Greek mythology-like, doesn't it?) Telematics, according to Wikipedia, is "any integrated use of telecommunications and informatics." Not feeling terribly enlightened yet? Let's simplify it a bit and focus on vehicles. (That's where managing your school bus fleet comes in.)

Telematics describes the integration of vehicle-based hardware (for example, a Global Positioning System and a cellular communication unit) to transmit real-time data to a remote location for instant collection, processing, and subsequent transmission of actionable information (not data, there's a significant difference between data and information) to decision makers.

While your personal GPS is a great tool, it provides you with "in the moment" feedback on where you are; it does not tell you where you were an hour ago or two weeks ago. It does not measure your idling time and vehicle emissions, maintain a maintenance history of your vehicle, or track the comings and goings of the passengers in your car or van. It certainly does not provide you with the tools to inspect your car before you take a trip.

A comprehensive telematics product enables you to do all of these things and much more.

Baltimore County, Maryland, covers 610 square miles of suburban and rural communities and virtually encircles Baltimore City. The county's school bus system is a mix of 880 publicly owned and maintained route buses and 81 contractor-operated buses. Each day, the Office of Transportation's school buses transport approximately 70,000 students to 173 schools (not including privately operated special needs schools, some of which are located in other school districts), traveling 14 million miles each year and making 18,000 stops.

As with any school bus program, our transportation mission includes four elements:

- Safely transport students to and from school and extracurricular events.
- Operate efficiently and within budget.
- Support the instructional mission by delivering students to school ready to learn.
- Provide responsive customer service. A tall order indeed.

As budgets continued to shrink and demand for transportation for displaced students, special needs students, and students in magnet school and alternative education programs increased, the Office of Transportation decided that business as usual was not a viable option and began to look for technology solutions to ensure the district would still be able to accomplish its four-fold mission.

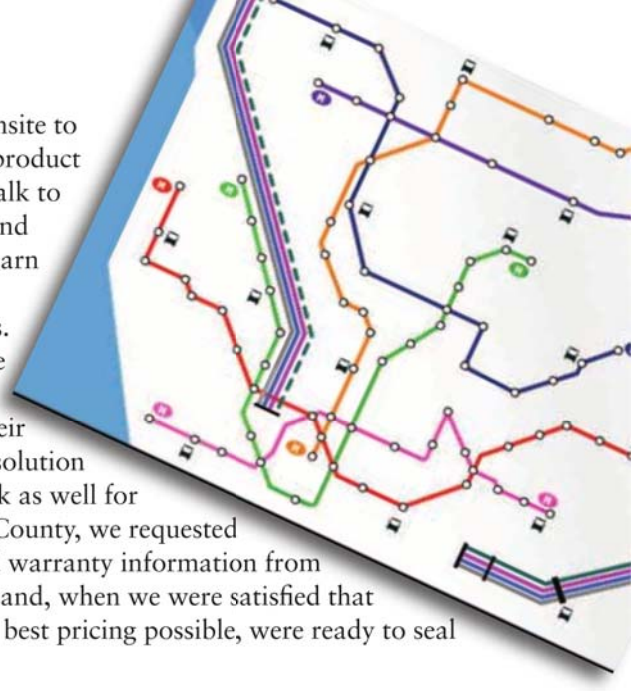
This article details the process we went through to find a telematics product that was within our financial means and addressed our operational needs, how we implemented a pilot program at 1 of our 11 bus lots, and the benefits we have realized.

The Wish List

Our first step was to assess our needs and identify desirable improvements to our business practices: a wish list. In actuality, this is a fairly easy process when management consults with those who deal daily with school bus maintenance, scheduling problems, parents, and principals concerned about "late" buses, students getting on the wrong bus or getting off at the wrong stop, complaints about speeding, and so much more.

After we completed this analysis, we knew we needed to exercise due diligence in identifying an affordable product that addresses all or most of these needs. This can be done by meeting vendors at conferences, contacting them directly to make presentations to your school system (why not invite the fiscal staff to attend), or contacting school districts that already are using telematics products.

We were fortunate that a neighboring school system had been using such a product for several years. We met with their district officials several times, including meeting them onsite to watch the product in action, talk to the users, and generally learn from their experiences.



When we were satisfied that their telematics solution would work as well for Baltimore County, we requested pricing and warranty information from the vendor and, when we were satisfied that we had the best pricing possible, were ready to seal the deal.

Making It Reality

Not unexpectedly, funding initially proved to be a challenge. Citing the federally recognized terrorist threat to school buses and the mass evacuation capabilities afforded by buses in times of disaster, we were able to secure a Homeland Security grant from our county government that enabled us to purchase enough units to equip 50 buses as a pilot program and pay the monthly service fee for a year.

We chose to install the components of the system ourselves to save money. After a short learning phase, the pace of installation picked up significantly. We expected a lot of buzz on the bus lot when strange black pieces of equipment began to appear on many of the school buses, so it was an easy decision to let everyone in on what was going to become an important part of their work lives.

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A system that enables management to know the whereabouts of a bus (and its driver), where it has been (maybe off route?), or if the bus has been speeding or arriving late at a stop, could be perceived as a "Big Brother" style threat. To counteract that possibility, we made the effort to let everyone know the capabilities of the equipment being installed on their buses and inform them that, yes, it would be used to monitor their performance but, more important for them, it would be used to support them when we received unfounded complaints about late buses.

We selected a small cadre of drivers for the initial training in the hope they would buy into the new program and serve as mentors for other drivers as they were

trained. Fortunately, these drivers recognized the program's positive aspects and became solid supporters on the bus lot.

Telematics in Action

So, what exactly did we buy? How does telematics improve our transportation program in Baltimore County? How does it support student safety, encourage efficiency, support the instructional mission, and enhance customer service?

Our bus drivers now conduct electronic signature verified, pre- and post-trip inspections using a handheld device that provides them with a customized drop-down menu of possible defects in each of eight inspection zones on the bus. When an inspection is completed, all identified problems are instantly transmitted via cellular link to the maintenance shop and become part of the permanent record for that bus. It is important to note that all data and information are stored off-site by the vendor—no school system technological support or hardware is needed for any of the applications.

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We also have the capability to examine, on a daily basis or over a period of time, the duration of the inspections and a history of all the defects identified. The bottom line is that managers are able to ensure that mandatory inspections are done and done well, all from their office. Ultimately, on-the-road breakdowns are reduced and more costly repairs are avoided when inspections are thorough and conducted on a regular basis.

Baltimore County's system provides multiple reports and actionable information that district officials can use for effective fleet management. We are able to identify the location of a bus in real-time—not a big deal in the GPS world—but also are able to find out where it was yesterday, and the day before, and the days before that.

Through the use of geo-fences (around a bus lot, for example), we can track the arrivals, departures, and stay times for any bus entering that zone. Or we can create geographic zones that can be used to audit how long a bus remained in a particular zone—information that is invaluable if you are trying to create scheduling efficiencies.

We know the average, maximum, and minimum amount of time to complete a route, or the average, maximum, and minimum route miles traveled over a time period that we select. It's an easy way to audit contractor invoices.

Questions about which buses have not left the bus lot in the morning can be answered with a quick click of the mouse button by the dispatcher. We can monitor idling times and dramatically reduce fuel costs. That information for an individual bus or for all of our fleet is available and the wasted fuel costs and emissions can be computed for us.

Such an array of readily accessible information is an invaluable tool in providing prompt and informative customer service. Questions about when a bus arrived at a bus stop (was it late today or is it consistently late?) or when it left (did it leave early?) can be answered immediately by anyone who has access to the information. If the bus is on time, complaints about chronic lateness can be refuted with hard facts. If valid, corrective actions are legitimate.

Our office staff now is better able to respond to questions about late buses.

Citizen complaints about speeding buses can be evaluated readily and the driving habits of drivers can be monitored over any given period of time and at any location. No more supervisors' time spent "staking out" a street to validate traffic safety complaints.

Our office staff now is better able to respond to questions about late buses and we have the capability to give user permission to principals or other school personnel to access information on the current location of buses that serve their students.

Finally, options are available to use radio-frequency identification cards to record when a student boards and leaves a bus—invaluable information when seeking Medicaid reimbursement or trying to determine when a student got off at the wrong bus stop.

Can It Get Better?

What does the future hold for us? Integrating the employee pay process or designing routes with telematics? Performance metrics for vehicles and personnel? Preventive diagnostics that will alert a maintenance shop that a bus might have a serious equipment failure in the next 1,000 miles? Data mining and risk analysis that will identify a driver who drives too fast or brakes too hard?

To paraphrase an old rock song—the future's so bright that you've got to wear shades. Our suggestion is to get in on it.

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