

## **New Technologies Make Transportation Management a Breeze**

*By Tim Quinn, vice president of RouteMatch Software*

Advanced computing technologies are the lifeblood of many industries, turning time-consuming tasks into efficient, streamlined processes. While some transportation providers have automated their transportation fleet with newer technologies, the majority of providers are either using older, DOS-based systems or still relying on manual methods to route and schedule vehicles.

In today's environment, sticking with older technologies or methods just doesn't make good business sense. First, transportation challenges are increasing exponentially, especially with rising demand for public transportation and paratransit services. In the midst of all this, operators must run their operation more efficiently than ever before. A fine balance must be struck between serving more customers, reducing operating expenses and achieving greater efficiencies.

Second, with thin-client computing and low-cost options for technology implementation, changing over to automated systems doesn't have to break the bank. In general, any operation will realize significant benefits—and a return on investment—by adopting newer technologies.

### **Reliability is Key to Transportation Automation**

It wasn't long ago when routing and scheduling vehicles amounted to no more than sticking pins into a map. While most schedulers don't resort to this old-fashioned method, many still do rely on manual methods for dispatching vehicles, determining schedules and keeping track of routes.

Manual scheduling might work for operations that have few vehicles and deal entirely with fixed-route and subscription trips, but when a scheduler must also handle last-minute trip requests and insert them into a pre-set scheduling system, hours can be spent trying to keep a fragile scheduling system from falling apart.

Of course, many providers have automated their operations to some extent. But, for those that still rely on manual and legacy systems, the technology has limited functionality, isn't scalable to meet growing demand and is cumbersome to use and maintain. Moving to a more advanced solution is now a question of when, not if.

Until recently, triangulation was the preferred method for automating the routing and scheduling of vehicles. However, rather than relying on actual data about the street network, triangulation calculates a straight-line distance between two points (Point A and Point B) and then adds a "fudge factor" to estimate the time it takes to travel between

these two points. This approach is unreliable at best and to compensate, schedulers end up having to resort to manual methods anyway.

In order for technology to be a wise investment, it needs to be extremely reliable, easy to use and able to help operators run their fleet meaner and leaner. With new technologies on the market—geographic information systems (GIS), global positioning systems (GPS), advancements in logistics heuristics, and wireless communications—routing, scheduling and tracking vehicles can take on a level of accuracy and reliability never seen before.

### **Getting a True Picture**

Advances in GIS have greatly benefited the transportation industry. Currently, GIS software is being used to handle everything from transportation planning, modeling and ridership analysis to improving transit service.

At the heart of GIS is the ability to store, display and analyze information about places. With GIS software, one can enter and manipulate geographic information such as addresses, create digital maps for analysis or presentation, and produce reports including maps and plans.

Transportation agencies have been adopting GIS to varying degrees. For routing, scheduling and fleet management, GIS is used largely for display and geocoding. This gives managers digital maps of a territory for planning purposes and helps pinpoint specific addresses and locations.

Yet, this is only the tip of the iceberg. GIS technology is now being combined with advanced logistic algorithms and intelligent software and as a result, the routing and scheduling of vehicles have reached a new plateau.

When a scheduler needs to determine routes for getting vehicles to the right place in the shortest amount of time, new routing and scheduling software references GIS data down to the lowest levels of granularity. For more precision, all road conditions are accounted for when building a schedule: one-way streets, no turning lanes, road construction, speed limits, surface streets vs. interstates, etc.

Using advanced, automated software that is integrated with a GIS real street network capability, operators know instantaneously when a route should be changed or driving times need to be updated. Schedules are now based on real world information rather than one's best guess.

And, when a provider needs to insert demand response trips into pre-set schedules, new automated routing and scheduling software using advanced logistic algorithms can process last-minute requests easily. Demand response requests are entered into the system and in seconds, recommended vehicles are listed that will accommodate new trips yet keep the original schedule in working order.

All these capabilities empower operators by giving them more accurate information about their fleet and street network. In turn, operators have the power to respond more quickly to ever-changing situations and keep the operation running smoothly and efficiently.

### **Anticipating and Avoiding Problems**

Using two-way radio has been the industry standard for dispatching vehicles and communicating with drivers about changes in schedule or the status of a pick-up or drop-off. Wireless technology is now affordable and convenient enough to replace this method of communication between the dispatching office and individual vehicles.

Mobile data communications (MDC) and Automated Vehicle Locators (AVLs) allow instantaneous communication between the home office and drivers, and the real-time tracking and tracing of vehicles.

Unlike today's dumb terminals, new MDC/AVL solutions work with a variety of more sophisticated, smart devices. Whether it's a handheld personal digital assistant (PDA), like a Compaq iPAQ™, a cell phone or a pager, operators can now install more cost-effective and flexible equipment for communications.

Not only are fixed data terminals costly, but once installed, they aren't portable and have no computing power or scalability. In contrast, common devices such as a PDA or smart pager can be used on multiple vehicles and a driver can take them off the vehicle to do a pre-inspection report, for example. They also lower capital expenses, costing between \$100 to \$4,800 per unit.

By equipping vehicles with smart computers, dispatchers are able to track and trace vehicles from the moment they leave the home office until they return at the end of the day. GIS-based software communicates with the vehicle constantly, informing the dispatcher about who's on the vehicle, when passengers were picked up, what stops were made and when and if the vehicle is operating safely. The driver communicates none of this information. It is all sent to the dispatcher automatically and in real-time from the smart terminal.

For scheduling purposes, dispatchers can now make changes to the schedule much more quickly, rather than relying on a call back from the driver. With the ability to track the progress of any one vehicle, a dispatcher can see when a vehicle is getting off schedule and make immediate adjustments to compensate.

And, at a time when many are worried about transportation security, MDC/AVL technology enables operators to be prepared for the worst and respond effectively. Without having to speak with the driver, a dispatcher is automatically alerted to equipment failure by sensors on the vehicle and even in a hostage situation, the driver can simply hit a "hot key" indicating an emergency.

With new wireless technology, operators can be more proactive, identify issues before they turn into real problems and improve response time. Also, administrative tasks such as driver manifests and reports can now be completed and sent back to the office automatically, increasing productivity and decreasing the workload.

### **Newer Technology Without the Headaches**

No matter how enticing, many operators hesitate to purchase advanced transportation management technology due to implementation costs and the need to hire IT staff. And, with technology constantly changing, many find that they can't keep pace with new hardware and software advances.

Today, operators can offload a lot of the technology management and decrease upfront costs by opting to outsource, or select an application service provider (ASP). With an ASP platform, operators minimize hardware costs and reduce the cost of ownership by allowing a third-party to host the applications and take care of the day-to-day technical worries—all with a small monthly fee.

As long as there is an Internet connection and a PC, any operator can implement and start running ASP-based technologies. Since new software and services can be added and enhanced at any time from the central hosting site, an operator can start small and gradually add-on new capabilities as business grows. Also, operators don't have to worry about ending up with outdated technology.

### **Now is the Time**

No one wants to be the early adopter, trying out new technology before it is affordable and practical. Fortunately for providers, the time has come for advanced routing and scheduling technology along with new wireless communications. It is now affordable, easy to manage and specifically designed for fixed and demand response transportation needs.

No longer is transportation management a frustrating exercise. Problems such as broken down vehicles, last-minute trip requests and road construction do not have to throw off an entire day's schedule. New advanced software can put operators in pole position—able to proactively manage the vehicle fleet, keep to a tight schedule and stay one step ahead of the next transportation challenge.

*RouteMatch Software ([www.routematch.com](http://www.routematch.com)) delivers transportation and logistic technology and services, with specific expertise in demand response or paratransit systems.*