Intermec

White
Paper

SUPPORTING MOBILE ENTERPRISE OPERATIONS WITH GPS: THE BENEFITS ARE EASY TO FIND

Intermec

From providing driving directions in real-time to helping plan the most efficient routes, Global Positioning System (GPS) technology helps mobile workers spend more time on the job — and less time getting there. GPS is a cost-effective enhancement for service, route delivery, dispatch, logistics and other mobile enterprise applications that provides a rapid return on investment by making workers more productive in the field and lowering the costs to support them.

Businesses use GPS technology to provide turn-by-turn driving directions, document route activity, plan routes, track vehicles and more. Location information can be used in a variety of software applications to improve fleet and asset management, reduce fuel consumption and save time for mobile workers.

Current mobile computer users are extremely well positioned to use GPS to leverage their investments in mobile automation. GPS systems, like the ones from Intermec partner LinksPoint, can often be added to existing route automation systems without requiring an investment in new mobile computers. GPS data can be easily integrated into legacy software applications, and packaged applications are also available.

Intermec and LinksPoint have developed this white paper to illustrate how GPS can reduce costs and improve efficiency for mobile enterprise operations. The paper will:

- Present an overview of GPS technology;
- Profile how field service, delivery, logistics and other mobile operations can be enhanced with GPS;
- Describe the Intermec-LinksPoint offerings;
- Provide the framework to conduct a return-on-investment analysis for GPS systems.

The benefits of GPS-enhanced operations are not limited to organizations with large mobile workforces — or large budgets. This white paper will help you understand how GPS can fit within your enterprise and the potential value it holds.

Technology Overview

GPS systems use a compact receiver and software to calculate the receiver's three-dimensional position and rate of speed by processing signals received from orbiting satellites. Software measures the difference in time from when the signal was received and when it was sent to calculate its relative distance from the particular satellite. Signals from at least four satellites are processed to make the calculations.

There is no separate charge or subscription required to receive satellite GPS signals. Like AM/FM radio, GPS transmissions are available free to anyone with a suitable receiver. For operations that only require location monitoring, GPS is an extremely cost-effective alternative to having mobile workers use cell phones or wireless data networks to report their whereabouts.

Commercial GPS systems typically are accurate within three to five meters when uncorrected and within three meters if the application supports real-time correction methods such as WAAS (Wide Area Augmentation System). Location accuracy from real-time processing is more than sufficient for route auditing, dispatch, workforce management and other mobile enterprise applications.

GPS data can be accessed and reported in multiple ways. When the GPS system is used with a mobile computer, the mobile computer can store GPS data and process it for mobile applications, or transmit location data to a central location in real-time using a wireless wide-area network (WWAN). GPS can be used concurrently with WWANs (regular data transmission rates will apply) and wireless LANs and does not interfere with either communication method. Location data can also be held in memory and later uploaded to a host computer system for analysis or storage.

GPS data can be presented to the user as coordinates, processed by application software to provide directions, alerts or other information. Some software applications feature a text-to-speech interface that processes GPS data in real time and converts it to audible speech output. Information is spoken to the user, which is an advantage in navigation applications because drivers can receive turn-by-turn driving directions without having to look at a display screen.

GPS receivers can be integrated with a mobile computer or attached to a vehicle or trailer. LinksPoint and Intermec offer a modular GPS receiver that snaps onto the bottom of an Intermec® 700 Series mobile computer to provide location data to software running on the device. LinksPoint's snap-on receiver can be used with most 700 Series models, which enables current users to add GPS capability to their applications without having to upgrade their mobile computers. 700 Series computers equipped with a LinksPoint receiver can still perform bar code scanning, image capture and communicate with mobile printers and other peripherals and communicate via Bluetooth, wireless LAN and wireless wide area networks.

The LinksPoint Bluetooth receiver/data logger is a remote peripheral that can be mounted in a vehicle or carried by the user. It can transmit data to any Bluetooth device for mobile GPS applications. Data can be communicated to the mobile computer constantly or at intervals, according to the needs of the application software. The remote device also has internal memory to store location data for later processing. As with, the snap-on GPS module, all the data capture and communications capabilities of the 700 Series or other Bluetooth-enabled Intermec computer are retained when the Bluetooth receiver/data logger is used.

Application software that uses the GPS data resides on the mobile computer or a computer hosting enterprise applications. Legacy software applications can be enhanced to take advantage of GPS information, and standalone applications can also be used. For example, a distribution company could implement a GPS system with a packaged navigation application to provide maps and driving directions. The receiver could also be used to collect location data to enhance its existing order tracking and delivery confirmation systems. Data integration and usage options are described further in the following section.

Applications

Using GPS to support field service, delivery and other mobile enterprise operations provides benefits in the field and at the office. Any time mobile workers need to know how to get where they need to go, or where managers want to know where they've been, GPS can conveniently collect and provide accurate information. In addition to location reporting, GPS systems can also provide turn-by-turn navigation, record speed traveled, measure stop/dwell times and apply a time-and-date stamp to location information, which is useful for route auditing and proof-of-delivery.

Here are some common GPS-enabled applications and examples of how they can be applied to improve mobile enterprise operations.

Navigation

This best-known use of GPS technology provides location information and directions to the user in real-time. You may already have experience with this application through an in-vehicle driver navigation system or by using a handheld receiver, which are popular with hikers, boaters and outdoorsmen. Navigation systems use a GPS receiver to calculate the user's position and speed. Application software provides the directions, which may be in the form of a digital map, turn-by-turn text directions on the computer screen, or voice instructions through text-to-speech output which is advantageous because it doesn't require the driver to look at the screen.

Businesses can benefit from navigation systems the same way thousands of hikers and lost drivers have. If mobile workers become lost or need directions to their next service or delivery location, a GPS navigation system can provide accurate directions to get them there via the most efficient route. Drivers spend less non-productive time searching for locations or stopping to ask directions, and the business benefits by satisfying its customers with on-time performance. Besides saving time, GPS-assisted navigation also saves money by reducing fuel costs for driving while lost or taking indirect routes.

Companies can add navigation features to their existing mobile applications or implement separate packaged software. Schwan's Home Service, the largest direct-to-home food delivery provider in the U.S., recently integrated navigation features into the "digital route book" system it developed in house to support its route managers. Schwan's, which operates the largest privately owned truck fleet in the world, expects a full and rapid return on investment for its fleet because of reduced fuel charges and greater route productivity that would result in more stops per day.

Route Auditing

Managers use route auditing, also called "breadcrumbing," applications to record, analyze and recreate activity that previously occurred in the field. The most common use is to compare the actual route that drivers took to the route that was planned. Monitoring route activity this way helps ensure that the most efficient routes are followed, helping companies to save fuel costs and ensure consistent, timely customer service. Applications can also flag excessively high or low daily mileage.

There are many more ways take advantage of GPS information for route auditing. By recording driving speed, companies can deter speeding and gain valuable documentation in case of accidents or insurance disputes. The ability to measure stop times can serve as a supervisor in the field, protecting the company against unauthorized or excessive work breaks by drivers. The information can also provide documentation to show compliance with union agreements or hours-of-service rules for truck drivers.

Applications can be set to automatically apply a "location stamp" to transactions. For example, consider a delivery application where drivers complete deliveries by scanning a bar code label on the parcel and entering "Delivered" or a similar transaction code into a handheld computer. A GPS location stamp would automatically record the location where the computer was when the parcel was scanned, thus providing accurate objective data to support the delivery record. Location stamping can be used for delivery confirmation and to provide proof that workers visited inspection or service locations.

Route Optimization

Route auditing goes hand in hand with route optimization, where GPS data can be used to analyze route activity and plan the most efficient routes and workforce assignments. Route optimization plans the most efficient routes and route auditing shows if they were followed. The GPS system provides data such as travel times between stops, slowdown areas and wait times that route planning, fleet management, dispatch and other software applications can use to perform at their best. By basing calculations on actual, accurate data from the field, software can optimize routes to reduce miles driven, improve utilization of fleet equipment and raise mobile worker productivity. Route optimization applications are especially valuable when an organization is adding or merging routes. Typical results from route optimization are an increase in the number of stops per day made by drivers and lower total fuel costs. Sometimes organizations can even eliminate vehicles or consolidate routes to cover the territory with no decline in service.

Automatic Vehicle Location (AVL)

Automatic Vehicle Location applications give supervisors or dispatchers real-time visibility into route operations by reporting the location of each vehicle or handheld computer. A GPS-enabled 700 Series computer can be used in place of traditional "black box" AVL systems to provide the same functionality plus many additional mobile computing capabilities.

AVL location information can be updated continually or at user-defined intervals. Enterprises can use the information for dynamic routing and dispatch, security, auditing and customer service applications. Dispatchers can take advantage of AVL to quickly satisfy service or parcel pick-up requests by locating the nearest available vehicle and routing it to the customer site. The tracking functionality can also be incorporated into customer service systems that let customers track shipments or get updates on service call status.

AVL enables supervisors to do their route auditing in real time. Delays or lengthy stop times can be flagged, enabling supervisors to contact drivers to see if there is a problem and reassign activities to proactively deal with potential delays or missed stops. Real-time monitoring also enhances security by facilitating rapid recovery of stolen vehicles. Applications can send automatic alerts if vehicles deviate from routes, which is desirable for tracking shipments of valuable goods and hazardous materials. GPS-enabled "panic buttons" give drivers additional security.

Identifying and Measuring Return on Investment

GPS systems often pay for themselves quickly. They provide outstanding return on investment because they can also improve other mobile applications. Operations like customer service, dispatch, data entry and record keeping all gain an efficiency boost when GPS receivers are used to collect accurate information in the field. GPS produces other benefits whose returns are hard to measure, such as better responsiveness and customer service, increased on-time performance and improved asset utilization.

A GPS receiver and all the software necessary for a navigation application can be implemented for less than $750 per vehicle. As we will see, this standard use of GPS technology can provide a rapid ROI and recurring cost savings. With GPS receivers in place, additional applications can be developed and added at low incremental cost. The expense varies according to the size and complexity of the application and the desired features. Enterprises may purchase powerful GPS application software for thousands of dollars, or may incur no packaged software expenses by integrating GPS data into their legacy applications.

Here is an example of how GPS provides value and lowers operating expenses. Consider an enterprise that purchases GPS receivers and software to add navigation features to the mobile computers used by its route drivers. The system can give drivers directions to unfamiliar customer sites and help prevent them from taking wrong turns or getting lost as they travel throughout the day.

Assume the company gains very modest benefits of saving one gallon of fuel per vehicle per day, and eliminates an average of 15 minutes of driver overtime per week. These benefits, which are conservative compared to most real-world applications, would offset the hardware and software costs to add GPS navigation to its mobile computing system.

By saving only one gallon of fuel a day, the company would save $7 per week per vehicle in fuel charges, based on gas cost of $1.40 per gallon (1 gallon/day x 5 days/week x $1.40/gallon). Multiply this figure by 50 working weeks in the year and the annual savings is $350.

Eliminating 15 minutes of overtime per week would save one hour every four weeks worked. Based on an average overtime pay rate of $50 per hour, the company would save $625 per route annually for a 50-week operation (15 minutes/week x 50 weeks ÷ 60 minutes/hour = hours saved. Multiply by $50/hour to determine $625 in annual savings).

Coupling the $625 labor savings with $350 in fuel savings produces annual cost savings of $975 per route, which would more than offset the cost of the GPS receiver and navigation software in the first year of operation. The organization would continue to save time, save fuel, and enjoy lower operating expenses and higher service levels year after year.

Developing additional applications is very cost effective because no additional GPS hardware is required. Route auditing, combined with time savings in the field, may enable companies to eliminate routes, or handle growth without adding drivers. Route auditing usually also produces significantly more fuel savings than systems that provide navigation assistance on an as-needed basis. These benefits could significantly help the bottom line by improving asset utilization and providing tremendous savings through the elimination of vehicles and associated insurance. Similarly, a GPS could pay for itself it ever helped recover a lost vehicle, or provided data to settle an accident, liability or insurance dispute.

GPS makes workers more productive by reducing travel time, facilitating the most efficient use of fleets and reducing and eliminating time that is wasted because drivers are lost. Improved productivity is an undeniable benefit, but its impact is difficult to measure. For service organizations, improved productivity may result in faster response times or more completed jobs per technician per week. Saving time for a route sales driver could lead to less rush and more time spent with customers, which usually translates into increased sales. Improved productivity can also support a growing business or enable routes to be expanded without adding more vehicles and workers, which gives a tremendous boost to profitability.

To determine the impact increased mobile worker productivity could have on your operation, you need to develop an estimate of the time savings a GPS system would produce. Next, review your operations, key performance metrics (e.g. revenue per sales call, work orders completed per technician) and business outlook to see how the time savings could be put to use, and what effect it could have on mobile operations.

For example, consider a fictional company that employs 10 service technicians who work 40 hours a week. The company reviews its operations and estimates it could save a half hour per week per technician by using GPS applications to plan the most efficient routes for daily service calls and eliminating the need for drivers to call in or ask customers directions to their next appointment. The half-hour of time for each technician is equivalent to 1.25 percent of the workweek, and could produce a similar productivity gain. By saving a total of five hours per week, the company gains the equivalent of an extra half-shift, without having to hire and train a new worker or pay any additional salary and benefits. The productivity gain could also reduce expensive overtime that eats into profit margins.

Improved productivity and efficient driving produce additional benefits that are hard to measure. What is the value of consistently hitting delivery windows for logistics and DSD operators? How much repeat service business is won because technicians arrive when they are supposed to, especially in hard-to-reach locations? What percentage of sales growth can be attributed to relationships strengthened because route sales personnel are spending more time with customers? Service technicians, route sales managers and other mobile workers make money for their companies when they are on site, not en route. Time is money, and the speed and efficiency with which mobile workers get to customer sites has an impact on profitability.

Conclusion

For mobile computer users, few incremental investments hold the same potential as GPS to provide cost savings and streamline operations. By conveniently providing the information needed to plan efficient mobile operations, and capturing route activity data to see that they're followed, GPS systems bring control to areas that have largely been out of reach. GPS-driven applications provide benefits that quickly pay for themselves and enhance the performance of more expensive and sophisticated field service, route sales, delivery, fleet management, logistics and other systems.

Intermec and LinksPoint have more information to help you learn about the capabilities, uses and benefits of GPS and mobile computing systems. Visit the LinksPoint Web site, www.linkspoint.com, to see additional white papers and case studies about the benefits of GPS technology and to learn more about the company's products. Visit www.intermec.com for more information about Intermec's award-winning 700 Series and other Bluetooth-enabled mobile computers for use with LinksPoint GPS receivers, and to download case studies and white papers covering all aspects of mobile automation projects.

Intermec®
expect MORE™

North America
Corporate Headquarters
6001 36th Avenue West
Everett, Washington 98203
tel: 425.348.2600
fax: 425.355.9551

Systems & Solutions
550 2nd Street S.E.
Cedar Rapids, Iowa 52401
tel: 319.369.3100
fax: 319.369.3453

Media Supplies
9290 Le Saint Drive
Fairfield, Ohio 45014
tel: 513.874.5882
fax: 513.874.8487

Canada
7065 Tranmere Drive
Mississauga, Ontario
L5S 1M2 Canada
tel: 905.673.9333
fax: 905.673.3974

Europe/
Middle East & Africa
Headquarters
Sovereign House
Vastern Road
Reading RG1 8BT
United Kingdom
tel: 44.118.987.9400
fax: 44.118.987.9401

Asia
Asia Regional Office
26-16 International Plaza
10 Anson Road
Singapore 079903
tel: 65.6324.8391
fax: 65.6324.8393

Intermec International, Inc.
14 Floor, IBM-Pacific Century Place
2A Workers Stadium
Chaoyang District, Beijing 100027
P.R. China
Tel: +86 (010).6539 1012
Fax: +86 (010).6539 1025

Australia
Level 7, 200 Pacific Highway
Crows Nest, NSW 2065
Australia
tel: 61.2.9492.4400
fax: 61.2.9954.6300

South America & Mexico
Intermec South America Ltda.
Rua Arandu 1544-15 andar
Edificio Itavera
Brooklin Novo 04562-031
Sao Paulo, SP
Brazil
tel: 55.11.5501.2070

Intermec Technologies de Mexico
Av Tamaulipas #141, Primer Piso
Col. Hipodromo Condesa
Mexico, DF, 06140 Mexico
tel: 525.55.211.1919
fax: 525.55.211.8121

Worldwide
Fax Document
Retrieval Service
800.755.5505
(North America Only)
tel: 650.556.8447

Internet
www.intermec.com

Sales
800.347.2636
(toll free in N.A.)
tel: 425.348.2726

Service and Support
800.755.5505
(toll free in N.A.)
tel: 425.356.1799

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