OFFICE OF
INSPECTOR
GENERAL
UNITED STATES POSTAL SERVICE

Global Positioning System: End-to-End Platform and Actionable, Robust Reports Needed to Achieve Goals and Potential Return-on-Investment

Management Advisory Report

September 30, 2011

Report Number DR-MA-11-003

OFFICE OF INSPECTOR GENERAL
UNITED STATES POSTAL SERVICE

HIGHLIGHTS

September 30, 2011

Global Positioning System: End-to-End Platform and Actionable, Robust Reports Needed to Achieve Goals and Potential Return-on-Investment

Report Number DR-MA-11-003

IMPACT ON:
Delivery and Transportation Operations

WHY THE OIG DID THE AUDIT:
To review the U.S. Postal Service's use of Global Positioning System (GPS) technology and identify opportunities in delivery and transportation operations.

WHAT THE OIG FOUND:
Various opportunities exist to enhance the use of GPS at the Postal Service. GPS technology has been implemented on only 3 percent of delivery vehicles and not on trucks that transport mail. For delivery operations, management uses standard GPS reports from the vendor (rather than customized reports) and districts do not consistently use exception data from the reports to manage operations. The existing GPS for delivery vehicles has helped in street management and anecdotally curtailed negative behavior, as well as provided a basis for return-on-investment. However, the Postal Service could develop an end-to-end, single-sourced GPS platform and back-office accountability for the entire fleet of vehicles and trucks with a focus on taking costs out of the delivery and transportation system.

WHAT THE OIG RECOMMENDED:
The OIG recommended that managment maximize existing GPS functions and create internal best practices for the existing GPS. We also recommended exploring an end-to-end GPS platform that includes full-range functionality and reports for Postal Service vehicles. In addition, we recommended establishing a cross-functional team of Postal Service managers to review existing barcode and scanning systems as well other related tracking and scanning opportunities.

WHAT MANAGEMENT SAID:
Management generally agreed with the findings and recommendations. They agreed to work with their vendor to improve the existing GPS program and develop an instructional webinar to provide the field focusing on key reports and successful practices by Quarter 1, fiscal year 2012. Management indicated the Information Technology group will take the lead in exploring the feasibility of an end-to-end platform as well as establish a cross-functional team to review existing barcode and scanning technology.

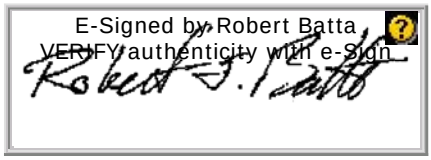
AUDITORS' COMMENTS: The U.S. Postal Service OIG considers management's comments responsive to the recommendations and corrective actions should resolve the issues.

Link to review the entire report

OFFICE OF INSPECTOR GENERAL
UNITED STATES POSTAL SERVICE

September 30, 2011

MEMORANDUM FOR: MEGAN J. BRENNAN
CHIEF OPERATING OFFICE AND EXECUTIVE VICE PRESIDENT



FROM: Robert J. Batta
Deputy Assistant Inspector General
for Mission Operations

SUBJECT: Management Advisory Report – Global Positioning System: End-to-End Platform and Actionable, Robust Reports Needed to Achieve Goals and Potential Return-on-Investment (Report Number DR-MA-11-003)

This report presents the results of our review of the Global Positioning System in the U.S. Postal Service (Project Number 11XG025DR000).

We appreciate the cooperation and courtesies provided by your staff. If you have any questions or need additional information, please contact Rita Oliver, director, Delivery, or me at 703-248-2100.

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Introduction

U.S. Postal Service senior management expressed a desire to explore Global Positioning System (GPS) technologies and opportunities that could benefit the Postal Service (Project Number 11XG025DR000). Our objectives were to review the Postal Service's use of GPS and other technological applications to identify additional opportunities in delivery and transportation operations.[1]

The Postal Service owns and operates the largest civilian vehicle fleet in the world with over 200,000 vehicles. The fleet covers both nationwide delivery operations between local Post Offices and neighborhood delivery and pick-up points and network transportation between cities and major facilities. Nationwide network transportation consists of both contracted highway transportation[2] and transportation that is furnished using Postal Service vehicles and employees — referred to as Postal Vehicle Service (PVS). In fiscal year (FY) 2010, letter carriers and PVS drivers traveled about 1.25 billion miles with fuel costs totaling more than $315 million.

GPS can help prevent and detect carrier misconduct and serve to protect the Postal Service's brand name. We estimate the Postal Service could implement GPS on approximately 189,000 Postal Service-owned and operated vehicles.[3]

The Chicago District, with the assistance of Postal Service Headquarters, acquired 500 GPS devices during FY 2008 to assist in addressing mail delivery issues, reducing carrier misconduct, and taking timely corrective action. Subsequently, Postal Service Headquarters distributed an additional 4,710 GPS devices to all areas of operations to allocate among their districts as needed. A total of 5,210 devices were installed on vehicles as an enhancement to its street management process in 48 of the 74 districts. This is about 3 percent of its delivery vehicle fleet (see Table 1). See Appendix A for additional information about this review.

[1] Transportation Operations excludes approximately 4,000 PVS trailers and 16,000 highway contractor routes (HCRs) covering more than 10,000 HCR suppliers providing transportation and box delivery services.
[2] As explained in Footnote 1, we excluded HCRs from the scope of this audit.
[3] As of February 2011, the Postal Service had 185,200 Postal Service-owned and operated long-life vehicles (LLVs), flexible fuel vehicles, and minivans used for mail delivery. These exclude HCRs because their inclusion would require legal involvement since they are not owned by the Postal Service.

Table 1. Number of GPS Devices per Postal Service Area

Area	Number of GPS Devices
Great Lakes	1,053
Northeast	916
Southeast[4]	748
Western	505
Eastern	499
Pacific	499
Southwest	497
Capital Metro	493
NATIONAL TOTAL	**5,210**

Source: Postal Service

Conclusion

The Postal Service's existing GPS capability and supporting infrastructure is limited. However, it could be expanded beyond a focus on tracking delivery vehicles to include a technological solution for other tracking and scanning opportunities as a way to complement customer service.

- Under the existing contract, GPS technology has been implemented on only 3 percent of the delivery vehicles with some basic functionality. Although the Postal Service explored the use of GPS in new PVS vehicles more than 8 years ago, it was not able to implement GPS for its PVS trucks because of functionality issues.

- For delivery operations, management uses standard GPS reports from the vendor rather than customized reports, and districts do not consistently use the exception data from the reports to manage operations.

- The existing GPS for delivery vehicles has helped in street management and anecdotally curtailed negative behavior, as well as provided a basis for return-on-investment (ROI).

- The Postal Service has not fully institutionalized best practices and accountability processes for GPS.

Various opportunities exist to enhance GPS technology at the Postal Service. The Postal Service could develop an end-to-end,[5] single-sourced GPS platform, and back-office accountability for the entire fleet of vehicles and trucks.

[4] The Southeast Area was eliminated and districts were moved to other areas.
[5] An end-to-end platform could involve the Postal Service purchasing no equipment or incurring any up-front costs and instead paying a monthly fee for generating reports, providing some analysis, and distributing the reports to the Postal Service.

Such a platform could include:

- Development and use of customized actionable reports augmented with advanced data analytics with real-time alerts, geo-fencing, and exception reporting on speeding, fuel usage, and potential unproductive use of time.

- Increased route efficiency, vehicle maintenance, and performance evaluation for both engine/drive train and braking systems.

- Using new barcode and scanning systems as part of a larger technology solution to bolster service.

Moreover, because GPS is not a core function of the Postal Service, vendors could manage this system, giving the Postal Service more ability to focus on its core delivery and transportation functions. If the Postal Service implements such a system, it could reap the benefits of having improved fleet management and take significant costs out of its delivery and transportation system. Vendors estimated ROIs over the 3-year contract period could range from $191 million to more than $435 million.[6]

Existing GPS

Contract Structure

Although the Postal Service has 185,200 delivery vehicles, the existing GPS contract covers only 5,210 vehicles, or 3 percent of the delivery fleet. The 5,210 GPS devices in these vehicles were acquired under a hardware purchase and installation agreement that includes a monthly airtime/monitoring fee that will cost more than $1.2 million for FY 2011. The GPS provided some basic functions, such as tracking idle time, vehicle starting and stopping, and the line of travel.

Because the Postal Service did not have an overall strategic framework and operational plan for the use of GPS technology, it purchased GPS devices on an “as needed” basis. The purchase did not require a Decision Analysis Report[7] or ROI projection, as it was below certain thresholds. The total amount spent on GPS for delivery operations to date is $3.2 million (see Table 2).

[6] These estimates have not been validated.
[7] A Decision Analysis Report is required for a capital investment of $5 million or more.

Table 2. Existing Contract Structure

Contract Structure	Required Contract Length	Hardware Cost Per Unit	Total Number of Current Devices	Total Hardware and Installation Costs Incurred	Airtime Cost $19.95 per Month per Vehicle for FY 2011	Airtime Cost During FYs 2008 – 2010	Total Contract Cost to Date
Hardware Purchase and Installation	**1 yr.**	**$229**	**5,210**	**$1,193,090**	**$1,247,274**	**$805,397**	**$3,245,761**

Source: U.S. Postal Service Office of Inspector General (OIG)

Prior to securing the existing GPS contract for delivery vehicles, the Postal Service attempted to implement GPS technology for about 4,000 PVS vehicles during 2003–2005 at a cost of $22.7 million. They concluded that PVS technology was not functional and did not achieve planned goals because of significant data connectivity issues, lack of resources, and inconsistent field compliance. Further, management stated the system was too complex for either employees or supervisors to use. Consequently, the Postal Service abandoned the initiative for PVS vehicles in FY 2008.

Reporting Capabilities

The Postal Service uses standard reports offered by the vendor to manage street operations. Our review of delivery units in three districts revealed that GPS data and reports were used in conjunction with other delivery reports as a part of street management. There is also a standard type of exception report in the existing system which uses e-mail alerts, but it has not been used consistently as a delivery management tool.

Postal Service Headquarters recommended that districts use the following standard reports to manage street operations: (1) Fleet Summary, (2) Detailed Activity, (3) Start Stop, and (4) Fleet Status (see illustrations of reports in Appendix B). Through these reports, the Postal Service can obtain almost any information available from the GPS, including the following vehicle information:

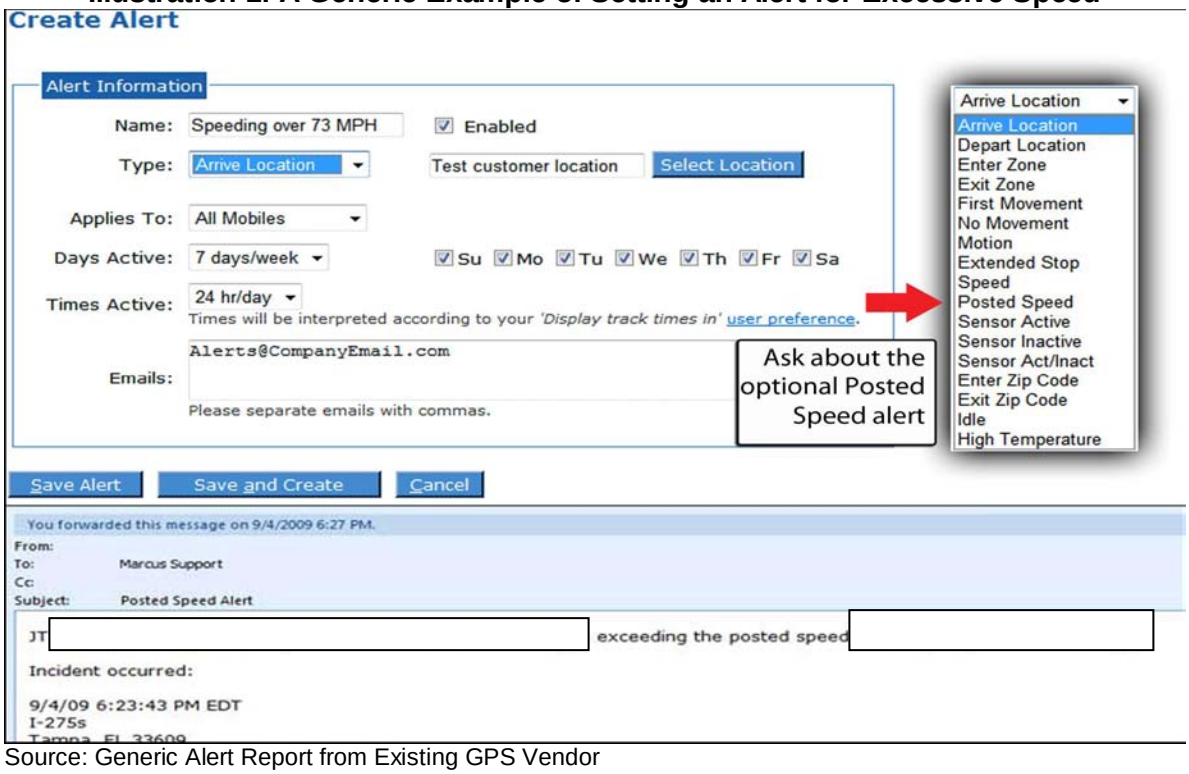
- Amount of idling[8] time – potential wasted fuel.
- Excessive starting and stopping.
- Breadcrumb trail (a detailed graph showing the movement of vehicle).
- Improved line of travel and route optimization.
- Potential unproductive use of time.[9]

These standard reports track a significant amount of data and, as a result, the responsibility of identifying exceptions/problems is placed on Postal Service supervisors, who are busy with their daily duties.

[8] Idling time is traditionally defined as a vehicle being turned on but not moving. However, with a GPS device, idling time is recorded when the ignition is powered even if the engine is not turned on.
[9] Potential unproductive use of time can generally be identified by reviewing the Idle and Start and Stop reports.

Alerts are part of the existing GPS and can provide a type of exception reporting with summary e-mail notifications of specific issues directly to supervisors. These types of reports could allow management to focus on specific carrier behavior, if needed. For example, Illustration 1 shows an alert that has been sent to identify speed in excess of designated miles per hour. This exception reporting allows delivery unit supervisors, who are routinely short on time, to focus on exception data only.

Illustration 1. A Generic Example of Setting an Alert for Excessive Speed



Source: Generic Alert Report from Existing GPS Vendor

Similar to alerts for speeding, GPS also can be used to set alerts for entry to or exit from a zone or location through a Geo-Fence application. The Postal Service can create areas on a carrier route for delivery and stop locations as depicted in the green highlights in Illustration 2.

Illustration 2. Generic Example of Creating a Geo-Fence for a Location

Source: Generic Geo-Fence Report from Current GPS Vendor

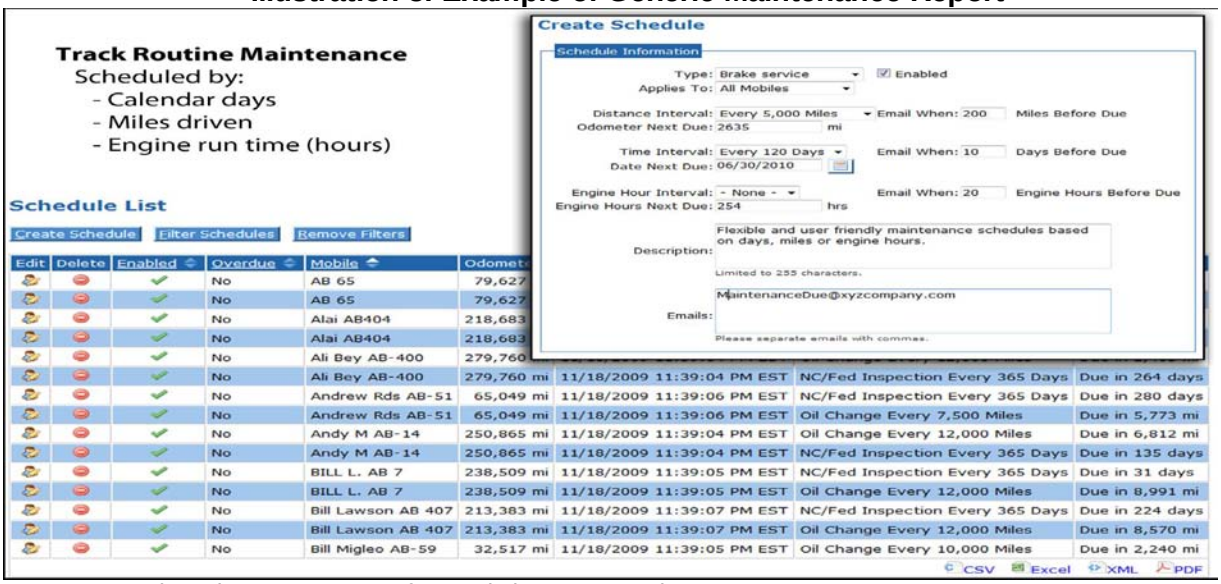
Delivery unit management stated they would have preferred to act on GPS data daily to assist street management but expressed not having sufficient time to always identify and follow-up on the exceptions. Developing strong customized exception reports can give supervisors more time to follow up on specific areas of concern, help ensure carrier accountability, and serve to protect the Postal Service's brand name.

In addition, the Postal Service decided not to use the maintenance function offered by its existing GPS vendor. One of the reasons offered was because of its regularly scheduled vehicle maintenance cycles established by vehicle maintenance facilities.

However, the GPS maintenance function could potentially enhance the vehicle maintenance system. For example, using the GPS maintenance feature could provide timely notifications to perform tire rotations, oil changes, and updated data on engines[10] (see Illustration 3).

[10] The age of the majority of Postal Service vehicles could limit the engine data that is available from the maintenance function.

Illustration 3. Example of Generic Maintenance Report



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		✓	No	AB 65	79,627			
		✓	No	Alai AB404	218,683			
		✓	No	Alai AB404	218,683			
		✓	No	Ali Bey AB-400	279,760			
		✓	No	Ali Bey AB-400	279,760 mi	11/18/2009 11:39:04 PM EST	NC/Fed Inspection Every 365 Days	Due in 264 days
		✓	No	Andrew Rds AB-51	65,049 mi	11/18/2009 11:39:06 PM EST	NC/Fed Inspection Every 365 Days	Due in 280 days
		✓	No	Andrew Rds AB-51	65,049 mi	11/18/2009 11:39:06 PM EST	Oil Change Every 7,500 Miles	Due in 5,773 mi
		✓	No	Andy M AB-14	250,865 mi	11/18/2009 11:39:04 PM EST	Oil Change Every 12,000 Miles	Due in 6,812 mi
		✓	No	Andy M AB-14	250,865 mi	11/18/2009 11:39:04 PM EST	NC/Fed Inspection Every 365 Days	Due in 135 days
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		✓	No	BILL L. AB 7	238,509 mi	11/18/2009 11:39:05 PM EST	Oil Change Every 12,000 Miles	Due in 8,991 mi
		✓	No	Bill Lawson AB 407	213,383 mi	11/18/2009 11:39:07 PM EST	NC/Fed Inspection Every 365 Days	Due in 224 days
		✓	No	Bill Lawson AB 407	213,383 mi	11/18/2009 11:39:07 PM EST	Oil Change Every 12,000 Miles	Due in 8,570 mi
		✓	No	Bill Migleo AB-59	32,517 mi	11/18/2009 11:39:05 PM EST	Oil Change Every 10,000 Miles	Due in 2,240 mi

Source: Generic Maintenance Report from Existing GPS Vendor.

Postal Service Headquarters officials are preparing GPS standard operating instructions on how to use the GPS reports to monitor street performance and assist in route structure and optimization. However, these instructions are in the early stages of refinement and implementation.

Return-on-Investment

The Postal Service has achieved some program benefits with GPS as a tool to assist in street management of carrier routes and reducing negative carrier behavior at the time of its rollout of limited GPS devices.

Furthermore, GPS is positioned to provide a ROI. Delivery Operations informed the OIG that, beginning in FY 2011, Postal Service Headquarters estimated the Postal Service could save nearly 15 minutes per vehicle per week for delivery units with GPS devices. We were told the estimate was used to reduce the specific districts' street operations budgets by more than 65,000 hours, or about $2.7 million.[11] Because we could not verify the 15-minute savings calculation,[12] we analyzed other GPS data to determine whether report customization and data analysis could provide information for Postal Service decisions and consideration.

The GPS idle time report data identified 166,927 instances of idling 15 minutes or more for the 5,210 GPS vehicles from October 2010 through March 2011. This equated to 85,911 hours, with 90 percent of the idling instances ranging from 15 to 60 minutes.[13]

[11] The 65,021 workhours multiplied by an estimated $42 an hour (city carrier level rate) equals $2,730,882.
[12] The Postal Service did not provide documentation to support calculation of the approximate 15-minute savings.
[13] There were 4,032 instances of idling more than 2 hours and one instance as high as 4 hours, but these extreme instances of idling were believed to be mostly bad signals and GPS errors.

If curtailed, this could equate to significant hours and fuel savings. In addition, time spent idling may indicate unproductive time by the carrier.

One way to identify and evaluate unproductive time is through report customization and data analysis of functions such as start/stop and idle time. The vendor stated that it routinely provided business analysis services to GPS customers to gain insight to corporate culture and focus on ROI opportunities. However, the Postal Service did not seek this type of service from the vendor.

Postal Service Processes and Culture

The Postal Service has begun to develop best practices and processes for GPS. During our review, the Postal Service began working on instructions to ensure that GPS data collection devices are implemented in the most efficient manner. The instructions also outline system roles and responsibilities for key headquarters, district, and unit personnel. In addition, the instructions outline personnel training, system definitions, naming conventions and expectations, and tracking.

Moreover, there is a significant opportunity for positive change in the Postal Service's delivery culture that could begin with management developing and communicating an overall GPS strategy, creating performance measures, engaging all levels of the organization in embracing technology, and using actionable reports to make informed decisions. Technology is value neutral. The value that is attached to any given piece of technology depends on who is using it, evaluating it, and what he or she does with it. If GPS data is not used and acted upon, savings opportunities are lost.

Future GPS and Tracking and Scanning Opportunities

Contract Structure

GPS contractors offer a wide range of services. Through our research and discussions with four GPS vendors, we were unable to identify any GPS vendor that provided services to a fleet as large as the Postal Service's. However, each of the vendors researched indicated that it could accommodate a large-scale deployment and provide the Postal Service with the required level of end-to-end functionality, corresponding reports, and a contract structured to suit Postal Service needs. For example, vendors indicated they could provide hardware, installation, repairs, software, training, advanced analytics, exception reporting, and, if desired, an operations center.[14] Table 3 shows a range of costs for a basic GPS (similar to the existing one used at the Postal Service for some of its delivery vehicles) to an expanded GPS with advanced analytics, exception reporting, and an operations center.

[14] An operations center would involve the vendor providing a staff of analysts to review and generate exception reporting and distribute these reports to management for corrective action on exceptions.

Table 3. Contract Structure Opportunities

Expanded GPS [15]	Contract Structure	Monthly Service Cost/per Unit	Estimated Monthly Service Cost for 200,000 Units	Contract Length	Range of Annual Contract Cost	Estimated ROI[16]
All vendors	Varies depending on client needs	$30-$65	$6-13 million	3 years	$72-$156 million	$191-$435 million

Source: OIG.

Either the vendor who would provide the Postal Service with an end-to-end solution and all the required reports for its vehicle fleet could manage it entirely or it could have any degree of Postal Service involvement desired. As GPS is not a core mail delivery function of the Postal Service, this technology could be substantially outsourced and require limited Postal Service involvement in its day-to-day management and maintenance. This would allow the Postal Service to concentrate on fleet management and removing costs out of the delivery and transportation network/systems. In any event, research shows the Postal Service should consider the following when selecting a vendor and contract/service:

- Knowing the top three operational issues that need to be resolved.
- Defining “must have” features and “like to have” features.
- Understanding ROI targets/performance, per route, per vehicle, per day.
- Identifying technology partners who can deliver “must have” features and provide a system to capture ROI targets.

Reporting Opportunities

As mentioned earlier, the Postal Service did not purchase customized reporting and data analytics from the existing GPS vendor. With customization, the Postal Service can isolate activities that may require referral for further management or investigative activities. Although management stated GPS data alone is typically insufficient in grievance hearings and other evidence (such as Managed Service Points (MSP) scans), overtime records and direct observations are needed. There are opportunities for the Postal Service and the OIG to collaborate and determine through data mining indicators of performance issues that need further evaluation.

With actionable, robust customized reports from the GPS augmented with advanced data analytics, the Postal Service could easily identify “actionable exceptions” for follow-up and resolution. These reports could include real-time alerts, geo-fencing, and exception reporting on speeding, fuel usage, and potential unproductive use of time. Implementation of the GPS and a robust reporting capability alone will not make the

[15] Expanded GPS includes four vendors (the current vendor and three other).
[16] These are gross estimates that have not been validated.

program successful. Outcome-oriented management will be needed as these reports will be key to increasing the visibility and efficiency of the fleet as well as reducing costs and enhancing supervisory capacity.

ROI Opportunities

Several opportunities exist to bolster the ROI. The three main sources of ROI from GPS technology include reducing idle time (fuel costs), maintenance costs, and overtime costs. Vendors estimated a range of costs from $191 million to more than $435 million.[17]

If the Postal Service installed GPS devices on all 185,200[18] delivery vehicles and used its estimated savings of approximately 15 minutes per device per week, we estimate there could be a potential annual savings of more than 2.4 million[19] workhours, or a net savings of more than $23 million.[20]

The areas of savings estimated by Postal Service Headquarters per GPS device per week, plus the potential of idle time and unproductive carrier time present opportunities to assist in determining an ROI. Further, there are other cost savings to consider, such as overtime and route structure savings. The Postal Service would need to analyze all potential cost savings and the resulting impact on investments since an end-to-end, single source contract solution entails an annual investment.

Replacing and Integrating Postal Service Delivery Systems

We identified two delivery/support systems that could potentially be eliminated if the Postal Service broadly implemented GPS: (1) Automated Vehicle Utilization System (AVUS) and (2) the MSP system,[21] which is integrated with the Delivery Operations Information System (DOIS).[22] The potential cost avoidance for eliminating these systems totals less than $350,000 annually. Because of the limited number of systems that could potentially be replaced, any financing of a new system would have to be the result of returns generated from using that system (see the Return on Investment section of this report).

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[17] We did not validate the data provided by the vendors. The Postal Service will need to validate these numbers in a Decision Analysis Report.

[18] The 185,200 delivery vehicles are out of the total delivery and transportation vehicle fleet of 200,300. We isolated delivery vehicles in this section because these are the only vehicles in which the 15-minute savings per week per device were attributed.

[19] The 185,200 vehicles multiplied by approximately 15 minutes multiplied by 52 weeks equals 144,456,000 minutes divided by 60 minutes per hour equals 2,407,600 estimated workhour savings. The 2,407,600 estimated workhour savings multiplied by an estimated $42 an hour (city carrier level rate) equals $101,119,200 million annually.

[20] The cost of equipping all 185,200 delivery vehicles with GPS would be at least $77,784,000 annually ($35 a month per device multiplied by 12 months multiplied by 185,200 delivery vehicles). Estimated savings of $101,119,200 minus the $77,784,000 additional investment equals a net savings of $23,335,200.

[21] A tool designed to monitor consistency of delivery time and enhance street management through use of a mobile scanner.

[22] AVUS provides Delivery and Vehicle Maintenance Facility managers with daily delivery vehicle activity information; and MSP is part of DOIS, which provides Delivery Operations with delivery unit management information. DOIS assists with analyzing route inspection information and performing route adjustments.

We also looked at what delivery systems could be integrated with the GPS over time, as the technology is refined and embraced (see Table 4).

Table 4. Potential Systems Integration

Carrier Optimal Routing (COR)
DOIS
Customer Service Daily Reporting System
Collection Point Management System
Solution Enterprise Asset Management

Source: OIG

In addition, GPS technology could provide an ancillary benefit in eliminating manual scanning at certain locations by carriers' MSP[23] while delivering mail on the street. The GPS could provide data on carrier locations without carrier action, thereby helping to preserve data integrity, as well as the chances of missed scans.

Tracking and Scanning Opportunities

The Postal Service has an opportunity to optimize its data collection capabilities. The Postal Service already collects data by using carriers to scan barcodes to identify mail in transit or upon delivery of a package. They also use scans to identify LLV and truck locations at certain points in the network. However, scanning of barcodes is "active scanning," which requires a carrier or clerk to hold a reader device over a barcode image to obtain information on a mailpiece. Opportunities may exist to use "passive scanning" technologies along with GPS to track mail on a real-time basis in addition to tracking vehicles. Passive scanning occurs automatically when an object passes a reading device and transmits information about the mailpiece.

Tracking and scanning methods can involve low-tech or high-tech solutions or a combination of both solutions and should be based on cost and business needs. Over time certain technologies — such as radio frequency identification (RFID) — have come down in cost and may also be viable options.

[23] City carriers are instructed to use the mobile scanner to scan bar codes placed at service points reflecting key elements of the carrier workday such as first delivery and last delivery.

Table 5 shows scanning devices, types, methods, and sources.

Table 5. Scanning Sources and Methods

Device	What is Scanned	Method of Scans	How Scans Are Conducted
Mobile Handheld	Barcode	Active	Carrier/Driver
Passive Scanners Installed on Vehicles Along With GPS	Real-Time Barcode	Active/Passive	Carrier/Device
2D Tag	Barcode Tags	Active/Passive	Carrier/Device
RFID	Real-Time Tags	Passive	Device

In addition to barcode scans and GPS, mail and equipment tracking and scanning solutions could involve 2D Barcode technology and RFID as follows:

- 2D Barcode technology uses a two-dimensional barcode graphical image that stores information both horizontally — as one-dimensional bar codes do — and vertically. As a result of that construction, 2D Barcodes can store up to 7,089 characters, significantly greater storage than is possible with the 20-character capacity of the currently used one-dimensional barcode.

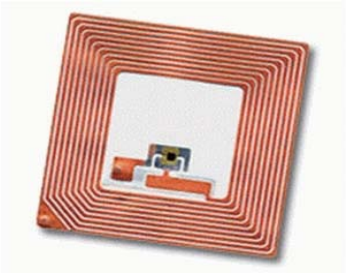
  Some potential advantages of 2D Barcodes for the Postal Service would be the ability to store large amounts of data related to shipping date, product quantities, and product codes; and the ability to attach the barcodes to mail products for continual updating. For example, this technology could decrease the time needed for postal clerks at the business mail entry unit to enter information upon receipt and potentially reduce input errors (see Illustration 4 for an example of a 2D Barcode).

Illustration 4. 2D Barcode

Source: Wikipedia.

- RFID is a technology that uses radio waves to exchange data between a reader and an electronic tag attached to an object for the purpose of identification and tracking. RFID involves applying RFID tags to items, boxes, or pallets. Tags vary greatly in size, shape, and capabilities (see Illustration 5).

Illustration 5. RFID Tag



Source: Wikipedia.

RFID tags could track packages in real time from the moment of mail acceptance until its final destination and at every point in between. This system would require little to no human interaction with the packages as sensors would feed the tracking data to computers. This would optimize routing through the processing network and reduce the amount of the time it takes for mail to reach its destination. Simply put, RFID works like a toll tag; drivers with toll tags no longer have the traffic back-ups or slowdowns created by tollbooths. It would be equivalent to bypassing human interaction and using the most optimal way to reach your destination. The package tracking data would be linked to the GPS transmitter in the carrier's vehicle, allowing the customer to go online and see the exact location of the package.

This RFID functionality in an expanded GPS could potentially make the Postal Service more competitive in the package/parcel market. The OIG sponsored a blog on RFID that showed favorable results. As to whether the Postal Service should invest in RFID, 137 of 217 participants (63 percent) responded that they should invest. When asked if the Postal Service were to invest in RFID, would the Postal Service become their preferred shipping partner, 125 of 181 participants (69 percent) responded that they would become their preferred partner. In addition, the blog asked if they would be willing to pay for the additional RFID technology and 94 of 187 participants (50 percent) responded they would be willing to pay.

Recommendations

We recommend the chief operating officer and executive vice president:

1. Maximize existing Global Positioning System functions and reports.

2. Create internal best practices and accountability processes, including those related to carrier accountability, for the existing Global Positioning System and integrate them into the Postal Service culture.

3. Explore an end-to-end Global Positioning System platform that includes a full-range of functionality and reports covering applicable Postal Service vehicles.

4. Establish a cross-functional operational team of Postal Service management to review existing barcode and scanning systems as well as Global Positioning System and other related tracking and scanning opportunities to bolster efficiency and service, as part of a larger technology solution.

Management's Comments

Management generally agreed with the findings and recommendations in the report. Management stated plans for expanding this program in Delivery Operations were put on hold due to the current financial situation of the U. S. Postal Service. Management stated they will continue to work with their vendor to improve the GPS program in Delivery Operations to maximize GPS with customized reports as necessary and feasible. However, management indicated that the report did not validate the vendor estimates of cost savings or address the airtime costs. In regard to maximizing existing GPS functions, management plans to share best practices by developing an instructional webinar for field locations that will include uses for key reports and share successful practices by FY 2012, Quarter 1. Management also indicated the Information Technology group will take the lead in exploring the feasibility of an end-to-end platform utilizing GPS to assist in managing the fleet and establishing a cross-functional team to review existing barcode and scanning technology as well as GPS and other related tracking systems. Management plans to issue a report on these issues at the end of FY 2012. See Appendix C for management's comments in their entirety.

Evaluation of Management's Comments

The OIG considers management's comments responsive to the recommendations and corrective actions should resolve the issues identified in the report. We acknowledge the difficult financial times, and agree the vendor estimates of potential savings need further validation and airtime expense is potentially a major cost.

Appendix A: Additional Information

Background

The Postal Service owns and operates the largest civilian vehicle fleet in the world with over 200,000 vehicles. The fleet covers both nationwide delivery operations between local Post Offices and neighborhood delivery and pick-up points and network transportation between cities and major facilities. Nationwide network transportation consists of both contracted highway transportation[24] and transportation that is furnished using Postal Service vehicles and employees — referred to as PVS. In FY 2010, letter carriers and PVS drivers traveled about 1.25 billion miles with fuel costs totaling more than $315 million.

GPS can help prevent and detect carrier misconduct and serve to protect the Postal Service's brand name. We estimate the Postal Service could implement GPS on approximately 189,000 Postal Service-owned and operated vehicles.[25]

The Chicago District, with the assistance of Postal Service Headquarters, acquired 500 GPS devices during fiscal year FY 2008 to assist in addressing mail delivery issues, reducing carrier misconduct, and taking timely corrective action. Subsequently, Postal Service Headquarters distributed an additional 4,710 GPS devices to all areas of operations to allocate among their districts as needed. A total of 5,210 devices were installed on vehicles as an enhancement to its street management process in 48 of the 74 districts. This is about 3 percent of its delivery vehicle fleet (see Table 6).

[24] As explained in Footnote 1, we excluded HCRs from the scope of this audit.
[25] As of February 2011, the Postal Service had 185,200 Postal Service-owned and operated LLVs, flexible fuel vehicles, and minivans used for mail delivery. These exclude HCRs because their inclusion would require legal involvement since they are not owned by the Postal Service.

Table 6. Number of GPS Devices per Postal Service Area

Area	Number of GPS Devices
Great Lakes	1,053
Northeast	916
Southeast[26]	748
Western	505
Eastern	499
Pacific	499
Southwest	497
Capital Metro	493
NATIONAL TOTAL	**5,210**

Source: Postal Service

Objectives, Scope, and Methodology

Our objectives were to review the Postal Service's use of GPS and other technological applications to identify additional opportunities in delivery and transportation operations. Specifically, we examined the Postal Service's existing GPS and its associated contract structure and evaluated opportunities to further exploit GPS and integrate related technology. We also:

- Identified the universe of GPS devices by district.
- Reviewed the policy for implementing GPS in the Postal Service along with training for using the GPS software.
- Identified available reports in the GPS software and how they are used.
- Judgmentally selected the Chicago District for review, because it has employed GPS technology for the longest amount out time. Randomly sampled two additional districts for review (Atlanta and South Florida) to identify how they are using GPS.
- Interviewed several GPS vendors[27] to determine what GPS technologies are offered.

We conducted this review from February through September 2011 in accordance with the Council of the Inspectors General on Integrity and Efficiency, *Quality Standards for Inspection and Evaluation.* We discussed our observations and conclusions with management on August 24, 2011, and included their comments where appropriate.

[26] The Southeast Area was eliminated and districts were moved to other areas.
[27] We did not validate any claims or assertions offered by the four vendors.

To conduct this review, we relied on computer-processed data GPS data from the current GPS vendor. We did not test the validity of controls over these systems. However, we determined that the data was sufficiently reliable for the purpose of this report by confirming our analysis and results with Postal Service managers and other data sources.

Prior Audit Coverage

The OIG identified one audit directly related to our objectives that was issued in the past several years. *Management of City Letters Carriers' Street Performance* (Report Number DR-MA-09-001(R), dated March 26, 2009) found opportunities for the Postal Service to use controls such as GPS technology to thwart instances of carriers engaging in misconduct ranging from theft of time to inappropriate behavior while delivering mail.

The first installation of GPS technology in the Chicago District provides a greater opportunity to monitor route activities in real time and reduce city letter carriers' undue time charges. The OIG recommended deploying additional GPS devices in the Chicago District for more effective monitoring and tracking during street delivery. Management partially agreed with our recommendation and provided an alternate solution to providing devices in districts other than Chicago.

Appendix B: Example of Reports from Existing GPS Vendor

Fleet Summary Report

With the Fleet Summary report, a range of dates (day/week/month) can be reviewed summarizing:

- Number of vehicle stops.
- How long vehicle is stopped.
- Average time vehicle was stopped.

Management can use the Fleet Summary report to determine any route or carrier performance issues. A location zone (which includes ZIP Code™, route number, timeframe, and address) is programmed in the GPS and a sequence of deliveries is listed as a series of points on the route along with the amount of time from the last inspection (see Illustration 6).

Illustration 6. Fleet Summary Report

Fleet Summary Report for (D) GPS Fleet Solutions

Dates: 09/20/2010 To 10/20/2010

Fleet: City of Palm Coast

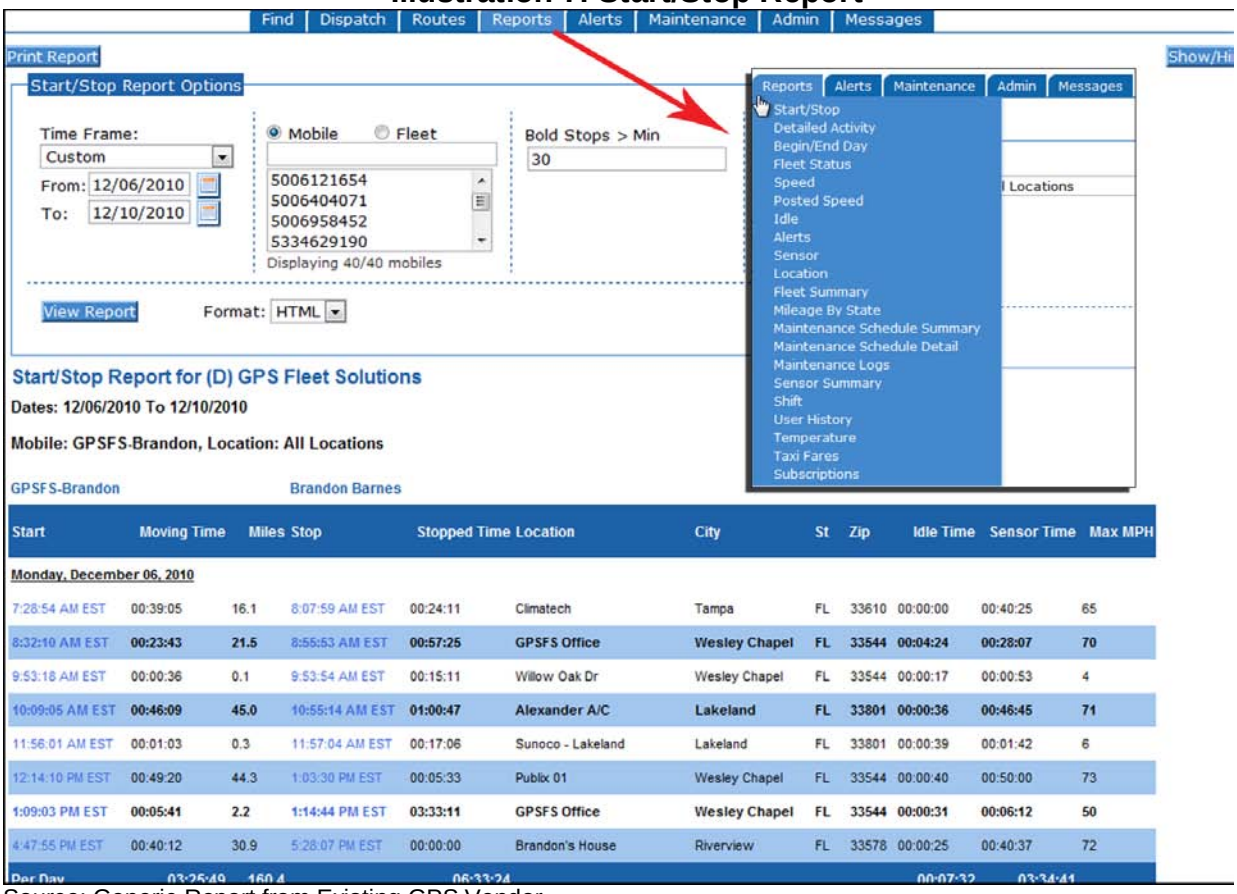
Mobile	Driver	Moving Time	Stopped Time	Idle Time	Total Miles	Total Stops	Avg Stop Length	Avg Stops / Day	Max MPH
City Palm - 329	-	1.01:59:17	1.17:11:16	08:06:34	451.3	104	00:23:45	3.4	48
City Palm - 392	-	2.23:51:38	3.06:50:48	2.01:10:56	1449.5	340	00:13:54	11	52
City Palm - 445	-	6.08:48:05	13.19:21:40	16:39:05	4129.7	887	00:22:24	28.6	71
City Palm - 941	-	2.19:29:52	2.15:00:08	1.16:23:42	1258.6	421	00:08:58	13.6	82
City Palm - 982	-	1.11:16:18	4.14:40:08	1.06:52:54	964.0	298	00:22:16	9.6	56
Totals/Averages		14.17:25:10	26.01:04:00	6.01:13:11	8253.1	2050	00:18:17	13.2	82

Source: Generic Fleet Summary Report from Existing GPS Vendor.

Start/Stop Report

The Start/Stop report details the turning on and off for each incident of the vehicle. This report is used to monitor carriers with excessive stops on their route. For example, a carrier might stop 50 times on a route. If the manager finds 50 stops on that particular route excessive, he or she would need to investigate and provide correction, if needed (see Illustration 7).

Illustration 7. Start/Stop Report



Source: Generic Report from Existing GPS Vendor

Fleet Status Report

The Fleet Status report shows the location of the vehicle and whether it is in motion. This report could be printed for a delivery unit or a range of delivery units. A supervisor or manager can run the report in the morning to ensure that all vehicles are in the parking lot, the GPS signal is working, and the vehicle has not been vandalized (see Illustration 8).

Illustration 8. Fleet Status Report

Flags Legend G: GPS P: Ping S: Speeding O: Old M: Moving I: Ignition

Mobile	Date/Time	Status	Driver	Location	City	St	ZipIP	MPH	Heading	Flags
0208805	5/12/2011 1:04:43 PM CDT	Stopped	-	75 S Lark St	New Orleans	LA	70124	0	SW (215°)	G-------
0208844	5/12/2011 3:47:25 PM CDT	Moving	-	770 S Galvez St	New Orleans	LA	70119	0	E (92°)	G--M-I--
0210617	5/12/2011 3:48:05 PM CDT	Moving	-	3912 Paris Ave	New Orleans	LA	70122	17	S (175°)	G--M-I--
0210655	5/12/2011 3:47:10 PM CDT	Moving	-	4195 Dumaine St	New Orleans	LA	70119	4	SE (128°)	G--M-I--
0215033	5/12/2011 3:48:07 PM CDT	Stopped	-	70124-006-PT13, :39, 303 HAY PL	New Orleans	LA	70124	0	E (88°)	G-------
0215140	5/12/2011 3:35:12 PM CDT	Stopped	-	86 Wren St	New Orleans	LA	70124	0	E (91°)	G-------
0215145	5/12/2011 1:50:14 PM CDT	Stopped	-	1446 Governor Nicholls St	New Orleans	LA	70116	0	SE (141°)	G-------

Source: Generic Report from Current GPS Vendor.

Detailed Activity Report

The Detailed Activity report is a “real-time” report that collects data every 2 seconds and transmits it every 5 minutes. This report includes data such driver, location, miles driven, and whether the vehicle is moving. It is recommended that supervisors examine this report during the day (see Illustration 9).

Illustration 9. Detailed Activity Report

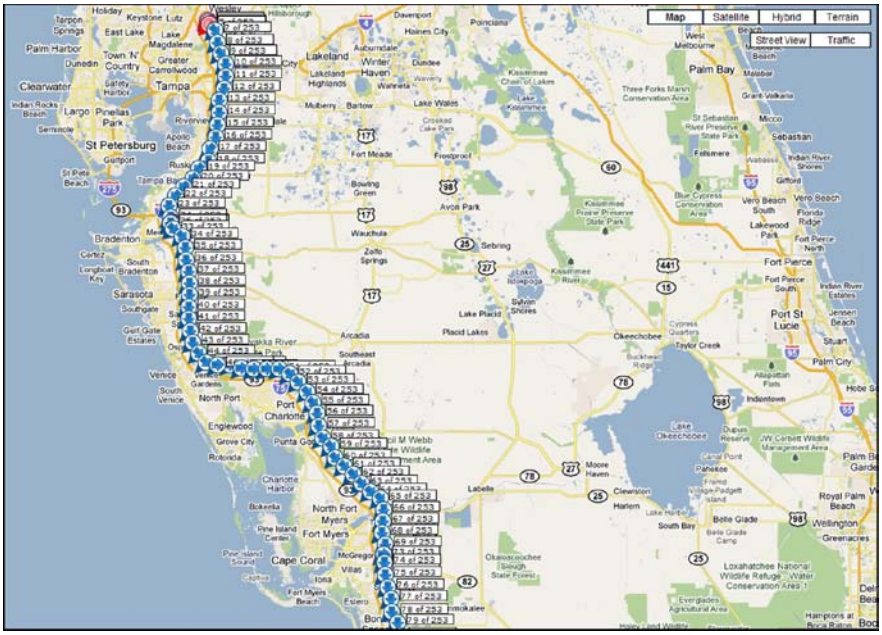
Flags Legend G: GPS P: Ping S: Speeding O: Old M: Moving I: Ignition

Time	Driver	Location	City	St	ZIP	Miles	MPH	Heading	Flags
Wednesday, May 11, 2011									
6:01:55 AM CDT	-	1418 Lafayette St	Fort Wayne	IN	46802	0.0	0	NW (331°)	GO---I--
6:02:19 AM CDT	-	1418 Lafayette St	Fort Wayne	IN	46802	0.0	0	N (357°)	GO------
7:59:43 AM CDT	-	1399 Barr St	Fort Wayne	IN	46802	0.0	0	S (182°)	G----I--
8:01:22 AM CDT	-	1400 Lafayette St	Fort Wayne	IN	46802	0.0	4	N (355°)	G--M-I--
8:03:23 AM CDT	-	182 W Douglas Ave	Fort Wayne	IN	46802	0.3	18	W (291°)	G--M-I--
8:04:32 AM CDT	-	265 W Douglas Ave	Fort Wayne	IN	46802	0.1	0	SE (153°)	G-------
8:09:59 AM CDT	-	265 W Douglas Ave	Fort Wayne	IN	46802	0.0	0	E (111°)	G----I--
8:10:37 AM CDT	-	288 W Douglas Ave	Fort Wayne	IN	46802	0.1	6	W (266°)	G--M-I--

Source: Generic Report from Existing GPS Vendor

The Detailed Activity report prints a breadcrumb trail (route history) in another window to show where the vehicle traveled. The breadcrumb trail could be used to determine line of travel, route optimization, and it could assist other street management activities (see Illustration 10).

Illustration 10. Breadcrumb Trail



Source: Generic Breadcrumb Trail from Current GPS Vendor

Idle Time Report

Idling time is when the vehicle engine is turned on and there is no physical movement of the vehicle for over 2 minutes. Idling time is not recorded until after 2 minutes has elapsed. A station manager might use the Idling Time report to see all carriers who idle more than 15 minutes and identify unnecessary fuel costs (see Illustration 11).

Illustration 11. Idle Time Report

Idle Time > = 15 Minutes

Start	End	Driver	Location	City	St	ZIP	Idle Time
Wednesday, May 11, 2011							
10:04:45 AM CDT	10:23:18 AM CDT	Polytechnic 1210	832 N Hughes St	Amarillo	TX	79107	00:18:33
11:11:41 AM CDT	11:56:16 AM CDT	Polytechnic 1210	832 N Hughes St	Amarillo	TX	79107	00:44:35
2:32:30 PM CDT	2:53:43 PM CDT	Polytechnic 1210	832 N Hughes St	Amarillo	TX	79107	00:21:13
3:05:21 PM CDT	4:10:49 PM CDT	Polytechnic 1210	832 N Hughes St	Amarillo	TX	79107	01:05:28
Per Day							**02:29:49**
Per Mobile							**02:29:49**

Source: Generic Report from Existing GPS Vendor

Appendix C: Management's Comments

DEAN J. GRANHOLM
VICE PRESIDENT
DELIVERY AND POST OFFICE OPERATIONS

UNITED STATES POSTAL SERVICE

September 30, 2011

Shirian Holland
Acting Director, OIG Audit Operations
1735 North Lynn Street
Arlington, VA 22209-2020

SUBJECT: Draft Management Advisory Report – Global Positioning System: End-to-End Platform and Actionable, Robust Reports Needed to Achieve Goals and Potential Return-on-Investment (Report Number DR-MA-11-DRAFT)

Thank you for the opportunity to review and comment on this subject draft management advisory report.

Overall, we concur with your conclusions that the U.S. Postal Service's (USPS) existing Global Positioning System (GPS) capability and supporting infrastructure is limited. Plans for expanding this program in Delivery Operations were put on hold due to the current financial situation of the USPS. While we have a desire to explore opportunities that GPS may offer us, realistically, the Postal Service is not in a position at this time to expend resources as described in this report. Your report admittedly did not validate vendor estimates of potential savings and did not expand upon airtime expense which traditionally has been the major cost in our experience with GPS.

Following are the responses to your recommendations contained in this report.

Recommendation 1

Maximize existing GPS functions and reports.

Response

Agreement in Principle

We will continue to work with the vendor to improve the existing GPS program in Delivery Operations and customized reports as necessary and feasible. We will however, not expand the existing program at this time.

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Recommendation 2

Create internal best practices and accountability processes, including those related to carrier accountability, for the existing GPS and integrate them into the Postal Service culture.

Response

Agreement in Principle

Delivery Operations will develop an instructional webinar to be provided to field users that will include uses for key reports and share successful practices. This webinar will be completed during Quarter 1, fiscal year (FY) 2012.

Target Date: December 31, 2011

Responsible Official: Robert Neal, Program Manager, Global Positioning System

Recommendation 3

Explore an end-to-end GPS platform that includes a full-range of functionality and reports covering applicable USPS vehicles.

Response

Agreement

The Information Technology group will take the lead in exploring the feasibility of an end-to-end platform utilizing GPS to assist the Postal Service in managing our fleet and issue a report of their findings by end of FY2012.

Target Date: September 30, 2012

Responsible Official: Ellis A. Burgoyne, Chief Information Officer and Executive Vice President

Recommendation 4

Establish a cross-functional team of USPS management to review existing barcode and scanning systems as well as GPS and other related tracking and scanning opportunities to bolster efficiency and service, as part of a larger technology solution.

Response

Agreement

The Information Technology group will take the lead in managing this cross-functional group and issue a report of their findings by end of FY2012.

Target Date: September 30, 2012

Responsible Official: Ellis A. Burgoyne, Chief Information Officer and Executive Vice President

Dean J. Granholm

cc: Mr. Burgoyne
Mr. Williams
Ms. Brownell
Mr. Cochrane
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Mr. Knoll
Ms. Mallonee
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