

OFFICE OF THE INSPECTOR GENERAL
City of Chicago



REPORT OF THE INSPECTOR GENERAL'S OFFICE:

***RECOMMENDATION TO IMPLEMENT GPS TECHNOLOGY IN CHICAGO
TAXICABS***

OCTOBER 2010

866-IG-TIPLINE (866-448-4754)

www.chicagoinspectorgeneral.org



OFFICE OF THE INSPECTOR GENERAL
City of Chicago

Joseph M. Ferguson
Inspector General

180 N. Michigan Avenue, Suite 2000
Chicago, Illinois 60601
Telephone: (773) 478-7799
Fax: (773) 478-3949

October 7, 2010

To the Mayor, Members of the City Council, the City Clerk, the City Treasurer, and the residents of the City of Chicago:

In response to the recent hit-and-run incident allegedly involving a taxicab that resulted in the death of a City resident¹, the IGO conducted an analysis of mandating the installation of a fleet-integrated Global Positioning System (GPS) in each Chicago taxicab and having periodic GPS data concerning the location of each taxicab collected, stored, and made available to the City. From our analysis, we concluded that this mandate would result in little additional cost to taxicab operators and customers, and that the City would likely realize a number of benefits in the areas of public safety, customer service, and transportation policy.

Before issuing the report, we provided a draft to relevant City departments to give them an opportunity to comment on the recommendation. Three of those departments - the Department of Business Affairs and Consumer Protection, the Police Department, and the Office of Emergency Management and Communications - responded and those responses are attached to this report.

Respectfully,

Joseph M. Ferguson
Inspector General
City of Chicago

¹ Kass, John. "Family looks for answers after son killed by Chicago cab." *Chicago Tribune*. August 10, 2010.

RECOMMENDATION TO IMPLEMENT GPS TECHNOLOGY IN CHICAGO TAXICABS

I. Background

While privately-owned and operated, the number and operation of cabs is regulated by the Public Vehicle Operations Division of the Department of Business Affairs and Consumer Protection. There are currently approximately 6,726 licensed taxicabs in the City.¹ Since 2007, cabs have been required to have a GPS installed in their vehicles. However, there is no requirement that the GPS installed be connected to a single, fleet-wide system. Moreover, there is no mandate that GPS data be tracked or collected.

II. Installing GPS in Taxicabs in New York City

Other major cities have recently mandated upgrading technology in taxicabs. Most prominently, in 2004, New York City (NYC) mandated a series of taxicab technology improvements collectively known as the Taxicab Passenger Enhancement Program (TPEP). The major components of TPEP included: “Automatic Trip Sheet Technology (electronic collection and reporting of passenger pick-up and drop-off locations, passenger fares, and number of passengers); Driver Information Monitor (DIM) with Text Messaging Capability, Credit/debit card payment capability; and Passenger Information Monitor (PIM) with payment screen, live map, and on screen content.”² These enhancements were mandated while a taxicab fare increase was also approved and seen as way to improve customer service in exchange for the fare increase.

1. Implementation of Technology Enhancements

In order to implement the technological mandate, NYC entered into a master contract with three vendors who provided “a single, integrated, ‘turn key’ [sic] system so that medallion owners would not need to purchase components or services from multiple vendors for each of the various technological enhancements.”³ The taxicab owners then purchased the system directly from one of the three contracted vendors.

2. GPS Data Collection

As part of the contract, the three vendors that provide the equipment to the taxicabs collect GPS data and submit it to NYC. Data is uploaded to a website by the three vendors periodically and is then made available to NYC personnel. In order to allay concerns about taxicab driver privacy, GPS data is not collected and stored until drivers log-on to the system to begin their shift. Currently, only pick-up and drop-off data is collected.

¹ City of Chicago. “Taxicab Medallion Detailed Information”. February 18, 2010 (<http://www.cityofchicago.org/content/dam/city/depts/bacp/publicvehicleinfo/medallionowners/medalliondetail021810.pdf> last accessed June 11, 2010)

² The City of New York. Taxi & Limousine Commission. Request for Information (RFI) RE: Improvements / Upgrades to the Taxicab Passenger Enhancement Program (T-PEP). April 14, 2009.

³ The City of New York. Taxi & Limousine Commission. Request for Information (RFI) RE: Improvements / Upgrades to the Taxicab Passenger Enhancement Program (T-PEP). April 14, 2009.

3. Results

Three years after implementation, NYC's system seems to be considered a success. The credit card component of the system is thought to have increased passenger volume and tips.⁴ The GPS data has been used to analyze traffic congestion, retrieve lost property, and create an iPhone and Android phone application that tells users the best corners from which to hail cabs. NYC's apparent success led to a similar mandate being enacted in Boston in early 2010.

III. Benefits of Tracking GPS Data

In addition to the benefits mentioned above, there are a number of other potential benefits associated with installing GPS in taxicabs and collecting GPS data.

1. Public Safety Benefits

There are likely to be several public safety benefits that could enhance passenger and taxicab driver safety.

(A) Cabs Involved in Hit and Run Accidents

As discussed above, the impetus for the IGO's analyzing the mandating of tracking GPS data in taxicabs was the recent hit-and-run incident allegedly involving a taxicab. In order to better determine how prevalent hit-and-run incidents involving taxicabs are, we obtained data from the Illinois Department of Transportation. The table below details statistics on hit-and-run accidents where the offending vehicle was a taxicab for 2008 and 2009.

Table 1- Hit-and-run Collisions In Which Taxicab is Offending Vehicle		
<i>Collision Type</i>	2008	2009
Pedestrians	48	40
Bicyclists	30	16
Other	7	5
Source: Illinois Department of Transportation		
Note: In 2008 and 2009, there were approximately 750 and 600 additional hit-and-run collisions, respectively, involving taxicabs and another vehicle in Chicago. However, for these incidents the data does not delineate whether the taxicab is the offending vehicle or the victim.		

If GPS data were collected, police would be better able to identify the taxicabs involved in these incidents.

(B) Enhanced Safety for Taxicab Drivers

Having a GPS unit that broadcasts each taxicab's location would likely increase safety for cab drivers. A recent study found that over one-fifth of Chicago taxicab drivers report having been

⁴ Grynbaum, Michael M. "New York's Cabbies Like Credit Cards? Go Figure." *New York Times*. November 7, 2009.

assaulted in their taxicab at some point during their careers.⁵ As discussed above, Boston recently implemented a similar system to the one currently in place in NYC. As part of this system, Boston mandated the installation of GPS-enabled panic buttons in taxicabs.⁶ The panic button will allow a distressed driver, with the push of a button, to alert his/her dispatcher when he/she is in distress and because of the GPS the dispatcher will be able to tell police and other emergency personnel the taxicab's exact location.

(C) *Canvassing Taxicabs in an Area Where a Crime Has Occurred*

An additional public safety benefit is that since the implementation of the new technology in NYC, police have been using the GPS data to identify which taxicabs were in an area where a crime occurred. Police have then been able to canvass those drivers to see if they saw anything related to the crime.

2. Customer Service

The prime reasoning behind NYC's implementation of GPS in taxicabs was enhanced customer service for taxicab passengers.

(A) *Locating lost property*

One of the prime customer service benefits of tracking GPS data in taxicabs is that when passengers leave property in taxicabs, it is easy to identify which vehicle the passenger was traveling in, contact the driver, and then reunite the passenger with his/her lost property. Even by only collecting pick up and drop off data (as in NYC), if the passenger can provide an approximate time and location where he/she was picked up/dropped off it should be relatively simple to pinpoint which taxicab he/she was riding in.

(B) *Better data about where to hail a taxicab*

By analyzing the GPS data regarding pick ups and drop offs, NYC has been able to determine which street corners are the likeliest from which to hail a cab. NYC has partnered with a private company to create a mobile application for iPhones and Android phones that provides this data to the public.⁷ This allows passengers to identify the best location from which to hail taxicabs and thus get to their destinations sooner.

3. Transportation Policy

Tracking the movement of taxicabs using GPS could help inform the City's transportation policy.

⁵ University of Illinois at Chicago. School of Labor and Employment Relations. "Driven Into Poverty: A Comprehensive Study of the Chicago Taxicab Industry. Report II: Violence." 2009? pg. 6.

⁶ Goodison, Donna. "Boston Cabs Hail new GPS System." *Boston Herald*. January 12, 2010.

⁷ Nusca, Andrew. Using GPS, New York City gains insight on taxi cab activity." *Smart Planet* April 14, 2010.

(A) *Study congestion patterns*

In NYC, “using data from the GPS devices in all New York City cabs, officials tracked the routes of tens of millions of taxi trips over the past two years”.⁸ NYC then used this data “to help improve traffic patterns along 34th Street”.⁹ The City could make similar use of taxicab-generated GPS data to study congestion patterns. Better data about traffic congestion could in turn help inform decisions about road construction, bike-only lanes, and other transportation policy-decisions.

IV. Cost of Tracking GPS data

The cost of installing GPS units and tracking GPS data in taxicabs would likely be borne primarily by taxicab owners and operators and to a lesser extent by the City.

1. Cost to Taxicab Owners and Operators

In NYC, the initial three year cost of installing the entire system (GPS, credit card reader, PIMs) and data collection was projected to be between \$2,900 and \$5,700.¹⁰ The variability in cost was based on how much advertising individual cab operators wanted to include in the system. The more advertising displayed in the taxicab, the more revenue for the system vendors, and thus a lower cost to the cab owners. According to the NYC Taxi and Limousine Commission (TLC), the NYC agency responsible for taxicab regulation, the actual three-year cost for the system was generally between \$2,500 to \$2,800.¹¹ However, this lower cost is likely due to the widespread adoption of displaying advertising on the PIMs.

In Chicago, the City has implemented a GPS tracking system for the City’s vehicles called Chicago Mobile Asset Tracking (CMAT). Using CMAT pricing information as a guide, we estimated the cost of installing a GPS system in Chicago taxicabs. For CMAT, the cost of a GPS unit including installation ranges from \$517 to \$627, while the monthly service cost of transmitting data from the GPS units are \$32 to \$59¹². Using the midpoints of each range, the three-year cost of a GPS system is \$2,210. Given that there may be unforeseen costs and that this pricing information is three years old, we raised the estimate of the three-year cost to \$2,500, resulting in an estimated annual cost of \$833.

According to a recent University of Illinois at Chicago (UIC) study on taxicab driver income, the gross annual income for a taxicab driver is approximately \$55,000.¹³ However, the City believes that this income estimate is low and has seen annual driver incomes as high as \$80,000.¹⁴ Given

⁸ Grynbaum, Michael. “In Manhattan, Driving is Toughest on Wednesdays”. *New York Times*. March 23, 2010.

⁹ *Id.*

¹⁰ New York City Taxi and Limousine Commission. “Medallion Taxicab Technology Enhancements.” September 30, 2006.

¹¹ Interview with TLC. May 26, 2010.

¹² City of Chicago. “Webtech Equipment and Services- 2007 Pricing”.

¹³ University of Illinois at Chicago. School of Labor and Employment Relations. “Driven Into Poverty: A Comprehensive Study of the Chicago Taxicab Industry. Report I: Income.” 2009? pg. 13.

¹⁴ Mitchell, Chip. “Study: Taxi-Driver Income a Pittance”. *Chicago Public Radio*. March 26, 2009.

that there are 10,500 drivers¹⁵ for the City's 6,726 taxicabs, using the UIC's study estimate that each driver produces \$55,000 in annual gross revenue, which the City believes understates revenue, then each taxicab produces \$85,000 in annual gross revenue.

Thus, the annual cost of the GPS unit and collecting the data translates to 1 percent of the annual gross revenue of a taxicab, according to the UIC study.

This cost would be further mitigated by the fact that a large portion of the City's taxicabs have already begun to implement this technology. In October 2008, Yellow, Checker, and Blue Diamond Taxi companies entered into a 10-year contract with Creative Mobile Technologies (CMT), which is one of the three contracted vendors for NYC's taxicabs, to install credit card swipe machines with GPS passenger maps very similar to the NYC system.¹⁶ These three cab companies control 2,244 cabs (33 percent) of the Chicago fleet. Additionally, Flash Cab has been using a GPS system to dispatch its 798 cabs (12 percent) for a number of years. Thus, at least 45 percent of the City's fleet has or soon will have installed this GPS technology.

2. Cost to City

In NYC's implementation, the primary cost to the City was writing the master contract with the three vendors. Because of the technical expertise and quality assurance testing of the data collection system, it cost NYC approximately \$2 million to write the contract and get the specifications for the system in place. On-going administration of the program is conducted by 5 staff members of TLC.

Given that Chicago should be able to piggyback on both NYC's and Boston's experience, the cost of writing a contract and regulations governing a GPS system should be lower than the \$2 million spent in NYC.

V. Privacy Concerns of Taxicab Drivers

When the system was first implemented in NYC, taxicab drivers were strongly opposed to GPS data collection because they argued that it was an invasion of their privacy. In order to stop the implementation, a group of taxicab drivers first went on strike and then sued NYC. After hearing arguments from the taxicab drivers and NYC, a federal court ruled that the benefits of the system outweighed the privacy concerns of drivers.¹⁷ Additionally, the court found that NYC had taken steps to ensure that data would not be collected when taxicabs were off duty and that on-duty taxicabs did not have an expectation of privacy.¹⁸

Were Chicago to mandate the collection of GPS data, taxicab drivers here would likely raise similar privacy objections. However, in our analysis, the federal court decision in NYC was

¹⁵ University of Illinois at Chicago. School of Labor and Employment Relations. "Driven Into Poverty: A Comprehensive Study of the Chicago Taxicab Industry. Report I: Income." 2009? pg. 2.

¹⁶ Creative Mobile Technologies. "Press Release: Nation's Largest Taxi Fleet Brings CMT's State-of-the Art Media Screens and Self-Swipe Credit Card Access to 2,600 Chicago Taxis." October 27, 2008.

¹⁷ 2007 WL 2826952 (S.D.N.Y.)

¹⁸ *Id.*

correct. The potential benefits of collecting GPS data outweigh the privacy concerns of on-duty taxicab drivers.

VI. Conclusion

In recent months, taxicabs drivers have advocated that the City increase taxicab fares.¹⁹ Since the City has not increased fares in five years, and the time between the two previous fare increases was four years, it seems likely that a fare increase is on the horizon.

City officials have also indicated that a fare increase is at least being considered.²⁰ The Chairman of the City Council Transportation Committee, Tom Allen, was more forceful when he stated last year that since the City has not increased fares in five years, taxicab drivers “definitely deserve a fare increase.”²¹

As part of the next fare increase, the City should consider mandating that taxicabs implement a GPS system that tracks the movement of on-duty taxicabs. This system would increase safety for passengers and cab drivers, improve customer service, and inform the City’s transportation policy. While there are costs associated with the system, the apparent success of NYC’s system and the adoption of a similar system in Boston indicate that the benefits outweigh the costs. Additionally, the privacy concerns of taxicab drivers can be alleviated by ensuring that data is only collected when taxicabs are on duty. Implementing this system would likely improve taxicab safety and customer service for the benefit of drivers and passengers alike.

¹⁹ Spielman. Fran. “Cabbies ask for fare hike, \$50 clean-up fee for vomit.” *Chicago Sun-Times*. September 24, 2009.

²⁰ *Id.*

²¹ *Id.*



City of Chicago
Richard M. Daley, Mayor

**Department of Business Affairs and
Consumer Protection**


Norma I. Reyes
Commissioner

Richard J. Daley Center
50 West Washington Street
Room 208
Chicago, Illinois 60602
(312) 744-4006
(312) 742-8700 (FAX)
(312) 742-8705 (TTY)

<http://www.cityofchicago.org>

MEMORANDUM

TO: Joseph Ferguson
Inspector General

FROM: Norma I. Reyes 
Commissioner

DATE: September 28, 2010

RE: Draft Recommendation to Implement GPS Technology in
Chicago Taxicabs

The City of Chicago Department of Business Affairs and Consumer Protection (BACP) has reviewed your draft report regarding the implementation of GPS in all Chicago taxicabs.

As the department charged with regulating the industry, BACP is very familiar with the programs in New York City and Boston regarding the implementation of GPS technology and New York's TPEP program.

As you are aware, in Chicago, unlike New York, many companies currently have some degree of GPS technology installed in their cabs, used predominantly for efficient dispatching. In New York, no similar system existed prior to implementation as taxicabs there are only allowed to provide street-hail service.

In Chicago, taxicabs have been equipped with electronic dispatch equipment for many years and electronic credit card processing since June 2004. Because various forms of dispatch and credit card equipment already exist and the industry had made considerable investment in technology as part of their business model, BACP does not believe it is in the best interest of the industry to mandate a technology that duplicates or is incompatible with existing technology.

BACP faces two additional challenges regarding the collection of this data. First, storage capacity on a dedicated server is necessary for the City to store detailed trip information. Second, programming is necessary to collect the information from various existing systems and make the data usable. In 2007, 2008, and 2009, BACP was unsuccessful in securing funding for these two items.



Further, with the rapid advances in technology over the past few years, data collection methods have changed. Since March, 2010, BACP has been working with both the Department of Innovation and Technology (DoIT) and the Chicago Department of Transportation (CDOT) regarding the collection of GPS data from taxicabs, storage capabilities of the City, and the costs and benefits of real time data versus data stored by the taxicab affiliation and reported to the City at a later time (weekly or monthly).

For example, CDOT currently has a program underway collecting real time data from CTA buses to study traffic congestion. In the future, we hope to be able to use this existing program to include the collection of data from taxicabs. Collecting real time data may be preferable for the collection of taxicab data; however, we are still examining the costs and benefits of collecting real time data versus reported data. Regardless of data collection method, however, there will clearly be a large volume of data which will require a substantial amount of storage capacity. Additionally, periodically, data will need to be archived, also a costly proposition.

Working with CDOT and DoIT, we are preparing to test both methods of data collection so that we will have a better understanding of the aforementioned issues. After these tests are complete, funding secured, and the infrastructure to support data collection is in place, BACP will require taxicabs to have a Passenger Information Monitor that includes credit card processing equipment in the back seat of the cab, full integration with the Taxi Access Program, and GPS.

Costs to the Industry

Equipment costs within the taxicab are borne by the taxicab owner and reporting requirements are borne by the taxicab affiliations.

Please feel free to contact me if you would like to discuss GPS in taxicabs further.

Cc:

Jody Weiss, Superintendent of CPD

Bobby Ware, Commissioner of CDOT

Jose M. Santiago, Executive Director OEMC

Hardik Bhatt, Chief Information Officer DoIT

Suzanne Malec-McKenna, Commissioner of Environment



City of Chicago
Richard M. Daley, Mayor

Chicago Police Department

Jody P. Weis
Superintendent of Police

3510 South Michigan Avenue
Chicago, Illinois 60653
(312) 745-6100

<http://www.cityofchicago.org>

MEMORANDUM

To: Joseph M. Ferguson
Inspector General
Office of the Inspector General

From: Jody P. Weis
Superintendent of Police
Chicago Police Department

RE: Draft Recommendation to Implement, Global Positioning System
Technology in Chicago Taxi Cabs

Date: October 6, 2010

The Police Department believes that the use of Global Positioning Systems (GPS) technology in Chicago taxicabs may yield public safety benefits for pedestrians, bicyclists, taxicab drivers and passengers.

The use of GPS technology will enhance the safety of individuals that are the victims of hit and run traffic accidents.

According to the Inspector General's Initial Report, in 2008, eighty-five pedestrians and bicyclists were the victims of hit and run accidents with taxicabs. In 2009, sixty-one pedestrians and bicyclists were the victims of hit and run collisions with taxicabs. In addition, in 2008 and 2009 there were 750 and 600 hit and run collisions, respectively, involving taxicabs and another vehicle in Chicago. If GPS data were available, the police would be able to work to identify the taxicabs that were at the scene when these accidents happened.

The use of GPS technology will benefit taxicab drivers and passengers that become crime victims.

GPS information detailing where a cab was located when a crime occurred will help the Chicago Police Department investigate crimes. The identification of crime patterns can be used to show what areas are being targeted. With this information, the Police Department can appropriately deploy resources.

Conclusion

The implementation of GPS technology in Chicago taxicabs will most likely enhance the safety of pedestrians, bicyclists, and vehicles that are the victims of hit and run accidents with taxicabs. GPS technology in taxicabs may also help increase the safety of taxicab drivers and passengers that are crime victims.





City of Chicago
Richard M. Daley, Mayor

**Office of Emergency Management
and Communications**

José A. Santiago
Executive Director

1411 West Madison Street
Chicago, Illinois 60607-1809
(312) 746-9111
(312) 746-9120 (FAX)

www.cityofchicago.org

THE OFFICE OF THE EXECUTIVE DIRECTOR

September 22, 2010

Mr. Joseph Ferguson
Inspector General
OFFICE OF THE INSPECTOR GENERAL
180 N. Michigan Avenue, Suite 2000
Chicago, IL 60601

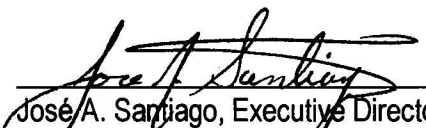
Re: Draft Recommendation to Implement GPS Technology in Chicago Taxicabs

Dear Sir Inspector General:

I am in receipt of the Draft Recommendation to Implement GPS Technology in Chicago Taxicabs dated August 23, 2010 (Draft). Please be advised that the Office of Emergency Management and Communications (OEMC) has been working on a similar project, as the one outlined in the Draft, with Chicago's Department of Transportation (CDOT) and Chicago Transit Authority (CTA). 1) Global Positioning System (GPS) project is currently installed in all CTA busses. Therefore, there will be no new costs to the City of Chicago (City) or the City taxpayers for the implementation of our GPS project with CTA; 2) CTA busses provide more reliable information regarding traffic times and flow than City cabs because busses travel in straight lines and do not deviate from predetermined routes. While we are aware of New York City's use of GPS in city cabs, and remain open to assisting with any City initiatives to use GPS in a similar fashion, our current priority is to increase public safety, customer service, and transportation policies, at no additional cost to the City or City taxpayers during these difficult economic times.

If additional information or discussion is desired, please contact my office at (312) 746-9400. Thank you for your time and attention to this matter.

Sincerely,



José A. Santiago, Executive Director
**THE OFFICE OF EMERGENCY MANAGEMENT
AND COMMUNICATIONS**

