

Developing a Successful GPS Offender Tracking Program

George B. Drake

Note: This course is limited to offender tracking technologies. A separate course has been prepared concerning home monitoring (RF) technologies.

A brief history

In a 1991 article in *The Futurist*, Colorado parole officer Max Winkle writes about a day when prisons would have no walls.ⁱ Inmates assigned to these “walking prisons” would be electronically tracked. Should they be so foolish to stray from their appointed schedule, the inmate would be “zapped” as a not so subtle reminder that their every move is being monitored. With great foresight, Winkler envisioned inmates being assigned restricted areas to stay away from and other areas that required their attendance.

A member of the technical staff at Lucent Technologies, Dr. Joseph Hoshen, was enamored with this concept. Having the technical background that Winkler lacked, he envisioned how such a system could be constructed. They teamed up, along with J. Sennott and penned “Keeping Tabs on Criminals”, the first serious article on offender tracking which was eventually published in IEEE’s *Spectrum* in 1995.ⁱⁱ Hoshen was later awarded the first offender tracking patent for his design.ⁱⁱⁱ

Meanwhile, an initiative was underway at Sandia National Laboratories in New Mexico researching the same topic. The labs had been approached by the New Mexico Corrections Department asking about technologies that were available for tracking offenders under their supervision. Sandia had developed many technologies applicable to this concept and was eager to become involved. On May 5, 1994, a Cooperative Research and Development Agreement was made with Spectrum Industries, a Santa Clara, California firm.^{iv} They were selected to

commercialize what was called the “Metro Track” system. Although the business venture was not successful, an important seed was planted. It would not germinate until 1997 when Pro Tech Monitoring, Inc. developed the first successful business model for tracking criminal offenders using the Global Positioning System (GPS) technology.

The first tracking device was carried by offenders in a back pack. Conceptually, it was the same as many of the two-piece devices on the market today. It consisted of a cell phone, GPS receiver, and a battery all integrated into a box weighing several pounds. The box was electronically tethered to the offender with a transmitter attached to the offender’s ankle. Although the GPS chip set used was primitive by today’s standards, and the cell phone used was a power hog, the system was considered a breakthrough and it launched a new era for the criminal justice system.

How the technology works

The primary technology behind the offender tracking systems is the Global Positioning System (GPS). With a minimum of twenty-four satellites orbiting the earth at an altitude of 20,000 km and having an orbital period of 12 hours, the satellites each transmit precise data transmissions timed to within 1 nanosecond.^v At any time, at least four satellites are within “view” of any location on Earth. With the assistance of ground monitoring stations, a GPS tracking device receives these transmissions and can calculate location using a complex algorithm.

Offender tracking devices contain GPS chip sets that receive the satellite transmissions. Active tracking devices utilize cellular communications to forward the collected location data to a monitoring station. Typically, the monitoring station compares this information with the

offender's zone and schedule requirements to assure compliance with the terms of the tracking program. Should a violation be discovered, a protocol is followed to inform the supervising officer. Usually, this is accomplished by utilizing one or more event reporting methodologies, such as text messaging, paging, e-mail or fax. Passive tracking systems operate similarly, except they do not update the monitoring station as often. Many agencies do not have the resources to monitor offenders around the clock and prefer to have the offenders' tracking information provided to them each workday morning.

Of course, the location data that is provided is that of the tracking device. In order to assure that the device is in the proximity of the assigned offender, a tethering system must be employed. For one-piece tracking units, the miniaturized device is secured directly onto the offender's ankle. Two-piece tracking systems consist of a portable tracking unit and a tethering cuff worn on the ankle. The cuff transmits a low powered signal that can be received by the tracking unit. If the offender fails to keep the tracking unit with him, an alert will be generated that warns officials that the offender is out of range of the tracking device.

Successful program management

The success of an offender tracking program can be no greater than the competence of the program's manager. The selection of the most appropriate manager starts with understanding the skill sets that are required to perform the job. The manager must be a planner, must manage a budget, should be a skilled communicator, must be able to monitor inventories and also have the skills to set goals and measure progress. The reason many programs are failing can be directly attributed to a lack of leadership and poor oversight. In fact, some agencies have no specific program management in place at all. Existing supervisors who have no expertise in the

offender tracking field are sometimes asked to take on these extra responsibilities. They often lack the time and expertise to do the job properly.

A moderately sized tracking program of 500 offenders may require an operating budget of over \$4 million^{vi}. Adding a modestly compensated manager will only increase the budget by about 2%.^{vii} Not only is this a small price to pay to help assure a program's success, it would be a breach of public trust to not do so.

A competent program manager will assure that policies and procedures are in place. This includes the implementation of response protocols that dictate the actions the field agents will take when violations occurs. The policies must be regularly reviewed for revision with care taken to archive all previous drafts. If a question arises on how a response was made in the past, the policy that was in effect at the time must be evaluated. This is especially important in protecting the agency from exposure to liability as the relevant policy and procedure documents must be made available for scrutiny by the courts.

The program manger is usually given the responsible of keeping the program within the constraints of a budget. Negotiating the best lease rates for equipment, managing personnel costs (including overtime) and keeping tabs on administrative overhead expenses are budgetary concerns that are usually under the control of a program manager. If the program requires offenders to share in the costs of their supervision, the manager must develop strategies to maximize collection rates. Keeping a program on budget takes constant attention and requires spending adjustments as the fiscal period progresses. Budget shortfalls are never welcomed by agency heads or other funding source representatives.

The program manager must be a skilled communicator. It is the manager who will articulate the mission for the tracking program and motivate the field staff to perform at the peak

of their ability. The manager must be a good listener in order to understand and address the concerns of the staff. The program manager may be the point person when dealing with the media when inquiries are made. Effectively communicating the program's mission, limitations and shortcomings in front of a television camera and a hostile news reporter requires a skill set that is hard to come by. Yet, a program's ultimate success or failure may hinge on the performance of a manager in that very situation.

A common area of contention between an agency and its selected vendor concerns inventory levels. Vendors are under pressure to realize a return on their investment. Tracking devices sitting on shelves usually do not generate revenue for the company. When a remote district office asks a vendor for additional devices, the vendor may be reluctant to provide the equipment because the agency, as a whole, has numerous devices not in use. Oftentimes, the problem is properly distributing the equipment already provided. Because district supervisors may be reluctant to voluntarily handover their excess inventory, it should be the program manager's responsibility to assure the equipment is distributed properly.

Finally, the program manager must be able to measure the progress toward the agency's stated goals for the program. This requires the careful collection and evaluation of records. If the agency's goal is to reduce overcrowding of a correctional facility, the manager must be able to show to what degree offenders were kept out of detention. If the emphasis of the program is to enhance public safety, the manager may need to show the number of arrests that occurred as a result of the enhanced supervision. In this case, an increased detention rate may be desirable. Creating clearly defined objectives and collecting data that will measure the progress toward meeting the objectives is imperative, and may be the most important element of demonstrating the success of an offender tracking program.

Selecting appropriate offenders for the program

In order to reach the objectives set for the program, the appropriate participants must be selected. In some cases, the selection process has been made by the legislation that funded the project. For example, many state legislatures passed bills that require all predatory sex offenders be tracked once they are released on parole. The statute may not authorize any other applications for the technology. However, many other jurisdictions have greater discretion when deciding who should be tracked. How they use this discretion may be very critical in determining the level of success of the program.

Keep in mind that this technology is very location specific. Offenders who have a history of committing crimes easily associated with a specific crime scene may be better candidates for tracking. Criminals who commit crimes on the Internet, for example, may be less appropriate candidates, as their physical location is irrelevant to the crimes that are committed.

Interestingly, child predators and pornographers, who are perhaps the most likely criminals to be placed in an offender tracking program, may not be the most ideal to track. Their crimes are done secretly, and are seldom reported to police. When a child predator is caught, it is often many months after the series of offenses began. Unfortunately, the victims of these crimes are often too young to recall the locations and times that the victimizations occurred. Without this information, the offender tracking provides little benefit. It should be said, however, if the tracking of these predatory criminals reduces these horrific crimes by even a small percent, the efforts are worthwhile.

All agencies that utilize an offender tracking technology should seriously consider using a crime scene correlation service. There are at least two vendors that offer to collect and compare all crime scene locations reported by local law enforcement agencies with the location

data that is generated by the offender tracking program. If a tracked offender was at or near the scene of a crime at the time it occurred, they are quickly identified as a suspect. Conversely, if an offender is a suspect of a crime, and his tracking points affirmatively show he was elsewhere, he can be cleared of any suspicion.

Keeping this service in mind, habitual burglars may be good candidates for an offender tracking program. Should they continue with their criminal lifestyle, they can be quickly caught and taken off the streets before they can victimize others. Hopefully, they will recognize the certainty of being caught and choose to discontinue, or at least postpone their destructive behavior.

The equipment can be used to keep supervised offenders from associating with one another. Most vendors' software has the capability of playing two or more offenders' recorded tracking points simultaneously. Should their trails intersect at any time, the agency can investigate the matter as a potential violation of their supervision conditions. Some vendors have automated this process, so that reports are generated any time selected offender's paths have crossed during a designated time period.

The state of California is initiating a comprehensive effort to monitor gang members.^{viii} Because gang members often commit location specific crimes, the targeting of this segment of the criminal population seems ideal. There is the potential to make each gang member a "floating" exclusion zone of other members of the gang. This would allow for the immediate notification to officials of the unlawful association. This approach would serve to not only provide valuable evidence concerning crimes committed by gang members, but may also be effective in totally disrupting the gangs.

Some agencies have made decisions on tracking drug users and traffickers. Many of the users are habitual criminals commonly involved in property crimes. The benefits of tracking these offenders were discussed above. However, a careful analysis of their tracking patterns may reveal how and where the offenders are obtaining drugs. Similarly, drug traffickers' movements can be analyzed to provide clues as to how the drugs arrive in a jurisdiction and where they are distributed within the jurisdiction.

There are many agencies that have begun using this technology to protect victims, especially those of domestic violence. Two approaches are used to accomplish this. An agency can simply create a large exclusionary zone around a victim's home. Automated alerts can be sent to the victim should the offender make an incursion into the zone. Supervisory agents and/or law enforcement can be simultaneously alerted. The second approach is more comprehensive. Some vendors provide a tracking device (usually a GPS enabled cell phone) to the victim as well as the offender. A floating exclusion zone is created wherever he/she travels. This provides an added level of security that allows a victim (and authorities) to be alerted any time the offender comes near the victim, whether or not he/she is at home.

A word of caution must be made about using this technology to "protect" victims. A motivated offender can almost certainly get to an offender before authorities will have an opportunity to respond. An enraged offender may simply cut off and discard the tracking equipment in order to prevent the victim from being notified of his approach. Domestic violence offenses are often emotionally driven and offenders often do not take the time to consider the consequences of their actions. Therefore, it would be a mistake to suggest that a victim is in any way "protected" from the offender. In fact, if the equipment causes the victim to let his/her guard down, he/she may be more vulnerable than before the equipment was utilized.

Creating appropriate response protocols

When an agency learns of an offender's tracking violation, a response is always needed. If violations are not promptly, systematically and consistently addressed, then the program will begin to lose credibility. Offenders will often test the resolve of a program in order to determine how careful they need to be. When a violation occurs and it is not addressed, the offender develops a perception that program infractions will be taken lightly and compliance with schedules and zone restrictions may be appreciated by an agency, but are not required. Also, if there is inconsistency among the supervising staff on how strictly violations are handled, offenders may become irritated and claim the staff is showing favoritism, or worse, is being discriminatory. The courts will question the fairness of how the agency handles the cases and may be reluctant to impose upon the offender a needed sanction.

A common reason for not responding to a tracking violation is due to a lack of manpower. Jurisdictions are often given a mandate to actively track one or more classes of offenders without being provided the budget needed to properly accomplish the task. As one can imagine, this is a recipe for disaster. Eventually, an offender will commit a series of blatant program infractions that will lead to the commission of a serious crime. Understandably, civic leaders and the entire community will become outraged when they learn the supervising agency, which could have prevented the incident from occurring, did nothing when they were repeatedly notified of the offender's schedule and zone infractions. Not only will this create a public relations nightmare, it will more than likely also result in serious civil liability to the agency.

Agencies that cannot provide around the clock responses to violations should consider opting for a passive tracking system. With a passive system, the alerts are provided to the supervising staff at the beginning of each working day. Although this approach will not avoid a

serious crime from occurring as described above, the expectations of responding will be much lower and the public relations nightmare and civil liability exposure may be lessened.

Therefore, any response protocol that is developed must be commensurate with the staffing levels that are available to respond. When active tracking is occurring, it is suggested that a matrix approach for responding to violations be developed. Start by prioritizing the various alarms that the system generates into high, medium or low categories. Then, by using a recognized risk assessment tool, place offenders into levels of high medium or low risk. By using a matrix, as the one shown below, differing levels of response can be created that take into consideration the seriousness of the of violation and the level of risk assigned to the offender. Some violations, such as certain zone infractions or equipment tampers, may need to default to a high response level, regardless of the perceived risk of the offender.

	High Priority Violation	Medium Priority Violation	Low Priority Violation
Highest Risk Offender	High	High	Med
Medium Risk Offender	High	Med	Low
Lower Risk Offender	Med	Low	Low

It is suggested that high response violations (red) have an immediate response 24 hours each and every day. The medium response violations (yellow) can be addressed as quickly as

possible, but only after all high responses have been cleared. Low level responses (green) may be given attention during the next business day.

After the initial development of a matrix response protocol, adjustments will likely be needed. Typically, agencies may quickly discover that they cannot keep up with the response demands that are created by the protocol. If this happens, an agencies can chose to either lower the criteria for classifying offenders as high and medium risk or they may consider reclassifying some of the alarms to lower priorities. A combination of these actions may even be more helpful in finding the right balance between responses required and manpower availability.

Conclusion

Implementing an offender tracking program is a difficult undertaking for an agency. A basic understanding of how a tracking system works is needed to appreciate the capabilities and limitations of the technology. Assigning a manager as the point person is a requirement for the program to operate efficiently and meet the expectations of the agency and the community at large. Choosing the most appropriate offenders for the program is vitally important for a successful program and properly responding to the violations committed by these offenders is needed to maintain the credibility of the program and to maintain a positive public image. Hopefully, the suggestions offered in this short course will be helpful in developing or maintaining your offender tracking program. For more information on operating an offender tracking program, go to <https://emresourcecenter.nlectc.du.edu> and register for access to the Electronic Monitoring Resource Center (EMRC). This federally funded project is a National Institute of Justice initiative that provides a wealth of information on offender tracking programs

and the state of the industry. If needed, live personal assistance can be provided for an agency needing help. All of the services offered by EMRC are provided at no cost to the agency.

ⁱ Winkler, M. "Walking Prisons: The Developing Technology of Electronic Controls", *The Futurist*, July-August 1991, pp. 34-36.

ⁱⁱ Hoshen, J, Sennott, J., Winkler, M., "Keeping Tabs on Criminals", *Spectrum, IEEE*, Volume 32, Issue 2, February 1995, pp. 26-32.

ⁱⁱⁱ US Patent Number 5,461,390 awarded on October 24, 1995

^{iv} CRADA SC94-1268S

^v Pogge, Richard W, *Real-World Relativity: The GPS Navigation System* (2004), <http://www.astronomy.ohio-state.edu/~pogge/Ast162/Unit5/gps.html>

^{vi} Drake, George, *EM Budget Worksheet* (2008), National Law Enforcement and Corrections Technology Center, <https://emresourcecenter.nlectc.du.edu>

^{vii} Drake, George, *EM Budget Worksheet* (2008), National Law Enforcement and Corrections Technology Center, <https://emresourcecenter.nlectc.du.edu>

^{viii} *Crime Control Digest*, May 25, 2007, <http://www.highbeam.com/doc/1P3-1316109701.html>