Geographic Information Systems:

Helping Corrections Inside And Outside Prison Walls

By Joe Russo

From tracking the concentration of probationers in a neighborhood to gang members in an institution, Geographic Information Systems (GIS) and mapping technology can be a great benefit to the corrections community. GIS combines traditional database systems with a graphic component that allows visual representation and analysis of tabular data on a map, helping agencies use geography to observe, analyze and provide solutions to challenges they face. Any data containing an address, such as the offender's residence, work location or incident location, can be spatially displayed and analyzed using GIS. External data or data that do not relate to criminal justice, such as school locations, parks and public transportation routes, also can be incorporated into GIS for further spatial analysis, as can nonpoint data, such as officer deployment areas.

GIS is not new to criminal justice. Police departments began creating crime maps as early as the 1960s to help identify crime patterns. One of the most publicized examples of GIS in criminal justice is the CompStat program created in New York in 1994. Using GIS, the CompStat program provides department executives and operation commanders with the ability to spatially display criminal activity so it can be instantly and more easily analyzed. This capability allowed the department to better identify and address crime patterns, trends and hot spots as they emerged. The CompStat program is given much credit for the sharp decline in crime in New York. GIS undoubtedly played a key role in this success.

In recent years, correctional agencies have begun exploring ways GIS can assist their daily operations. Community corrections and institutional corrections are two distinct areas in which mapping technology can be used in correctional settings.

Community Corrections

GIS and mapping technology can be very useful in working with individuals under community correctional supervision. Probation and parole professionals, as well as the communities they serve, can benefit greatly from streamlined assignments and the strategic placement of resources facilitated by using mapping technology.

Geographic Deployment. Using GIS, an administrator can create a map that indicates where offenders live and assign cases more equitably. Many benefits can result from assigning caseloads geographically. One such benefit is that an officer does not have to travel across the county to conduct home visits given that his or her entire caseload would reside in the same general area. Many GIS software packages can plan the most efficient route to perform these visits. Another benefit is that officers can become much more familiar with the areas where their clients live as they only need to focus on that particular portion of the jurisdiction. This allows the officer more opportunity to understand the offender's environment, become more involved with local treatment providers, and develop closer, more collaborative relationships with local police agencies. Focusing on a limited area also can enhance officers' enforcement role because they are more visible in the community.

Resource Allocation and Planning. GIS also is useful for resource allocation and agency planning. For example, if an agency was planning to implement a new day reporting center, a map displaying the density of offender residences with an overlay of the public transportation system would be useful in determining where to locate the center.

In Wisconsin, the Department of Corrections (DOC) sorted through its paper files and created a database of more than 4,500 records. Once the database was created, the DOC used pin and density maps to identify parolee and probationer locations and demonstrate concentrations of offenders. That information allowed the DOC to identify areas in need of increased neighborhood supervision. From four selected neighborhoods, DOC staff identified focus areas requiring increased resources. By focusing its efforts, mapping has allowed the DOC to strategically approach issues of supervision, perception of safety and offender movement. Consequently, service delivery has improved and probationers in these areas have had improved completion outcomes.[1]

Managing Sex Offenders. Sex offender activities are geographically restricted, making monitoring more challenging. To overcome this challenge, maps can be created by highlighting locations within a specified distance of another location. For example, GIS enables the user to select and display all the day care centers, schools or parks within a 1,000-foot radius of a registered sex offender's residence. Additionally, when a sex offender wants to change residences, GIS provides an easy

way to determine if the new address presents problems with regard to its proximity to day care centers, schools and similar environments.

Institutional Corrections

Generally, mapping and GIS data are thought of as addresses and locations in a community, but they also can be locations in a building or an institution. For GIS to be useful in an institutional setting, a map of the facility must be created. Once a layout is established, data such as inmate demographics, gang affiliations, locations of assaults and attempted escapes can be incorporated and analyzed. Displaying these data spatially can lead to a better understanding of the events and incidents within a facility. For example, if there has been a recent series of inmate-on-inmate assaults, GIS can be used to spatially and temporarily analyze the incidents in an attempt to predict or prevent future assaults.

Maps that represent where and when assaults are occurring can be generated so administrators can determine if any hot spots or trends become apparent. Through GIS, agencies may discover that assaults are occurring in the same general location and on the same shift. Further analysis may yield that this location is poorly lit or beyond the officer's line of sight. In any case, GIS will illuminate patterns in those data and assist in the prevention of future incidents.

At a National Institute of Justice (NIJ) conference on mapping in corrections, Michael Geerken of the Orleans Parish, La., Criminal Sheriff's Office discussed his work using institutional mapping. According to Geerken, the primary purpose of GIS is for operational, management and control efforts. As examples of possible use, he cited inmate tracking through real-time monitoring, classification and housing of inmates in accordance with security level, and identifying patterns and relationships related to security or immediate change. Geerken also demonstrated how his agency had generated maps showing the locations of those incarcerated according to gang membership and explained that this type of information can be valuable in preventing outbreaks of violence and assigning new inmates.

Getting Started

Technology Needs. To successfully implement a GIS program in an agency, resources must be identified for purchasing the necessary hardware, software and base maps. The minimum hardware requirements needed to operate a GIS program include a 400-megahertz computer containing at least 128 megabytes of RAM. A 21-inch computer monitor and printer/plotter also are recommended. Desktop GIS software is available for approximately $1,000 per license. For community-based

Sharing Data

There are a number of issues to consider regarding sharing data with the public, other agencies or researchers. A new publication by NIJ's Crime Mapping Research Center, *Privacy in the Information Age: A Guide for Sharing Crime Maps and Spatial Data*, addresses those issues and discusses real life instances of how agencies are dealing with them. Specifically, the publication covers:

- The costs and benefits of providing maps to citizens, other agencies and researchers;
- Privacy issues and how to address them;
- Development of local guidelines for Internet mapping and sharing maps and data;
- Examples of agencies that have successfully implemented Internet mapping while safeguarding privacy and minimizing liability;
- The need for disclaimers when providing maps and data on the Internet;
- The importance of geocoding 'hit rates' and the need to disclose them when providing maps; and
- Technical issues faced when posting maps, including static versus interactive maps, the variety of map types available and a brief discussion of the variability of software and hardware available.

Through their research, the authors drew conclusions about the current state of data sharing, what the current practices are, and what critical issues any agency should keep in mind when sharing data. They found that, "many agencies have moved forward with decisions on what data should be available through maps, how that data will be displayed, what should be provided as a disclaimer, and how to make data available to others." In general, "law enforcement agencies ... have favored making ... data available in a mapped format while at the same time, remaining sensitive to the privacy of victims."

In making recommendations and expressing caution, the researchers stated that, "Agencies must decide exactly what data they want to display; they must stay within the provisions of their state laws regarding privacy of addresses, phone numbers and other information; and they must provide guidelines to consumers on how to interpret maps." Finally, if an agency is interested in sharing its data with another agency, it should develop an agreement on what data will be provided and how the other agency will use those data.

The report also provides a list of resources, sample local law enforcement disclaimers used by agencies across the country, a discussion of security issues and resources, and sample memorandums of understandings agencies have used to set up information-sharing protocols.

Privacy in the Information Age: A Guide for Sharing Crime Maps and Spatial Data, authored by Julie Wartell and J. Thomas McEwen of the Institute for Law and Justice, was published by NIJ in July 2001. To view this and other crime mapping publications on the Internet, visit www.ojp.usdoj.gov/cmrc/pubs/welcome.html. To receive printed copies, contact the National Criminal Justice Reference Service at 1-800-851-3420 or Web site: www.ncjrs.org. ◆

applications, GIS maps may be available free of charge through the city's, state's or county's GIS/engineering department. For an institutional application, one will need to obtain a floor plan or blueprint of the facility. The blueprint file most likely will need translation to accommodate the chosen GIS application.

Training Needs. All the technology in the world will not help if no one knows how to use it. GIS use requires training, which the National Law Enforcement and Corrections Technology Center (NLECTC) and NIJ's Crime Mapping Research Center (CMRC) provide.

The Crime Mapping and Analysis Program (CMAP), located at the NLECTC Rocky Mountain Region office in Denver, provides free training in crime mapping and crime analysis. The one-week course is offered regularly in Denver and other regional NLECTC locations. To see descriptions and updated course listings, visit Web site: www.nlectc.org/cmap.

NIJ's CMRC supports the development of analytic mapping in criminal justice agencies. CMRC has developed training and software to make it easier for agencies interested in using spatial analysis. CMRC offers four training modules that range from the basics of crime mapping to integrating crime mapping into an agency. All four are available at Web site: www.ojp.usdoj.gov/nij/cmrc/training/download.html. A hands-on tutorial, Crime Map, also is available.

Intangible Needs. If a GIS program is going to be used in any agency, it must be run by a person who has a vision for the program and is willing to work continually toward its success. Without this person, a new GIS program, like any initiative, is vulnerable to a number of problems, including failures to update data, secure cooperation within the agency and with partner agencies, and overcome numerous other barriers.

Implementation Barriers

In late 1999, at the NIJ-sponsored Mapping in Corrections Resource Group Meeting, an assembly of professionals and researchers identified a number of potential barriers to implementing a mapping program in a correctional environment:

- *Institutional Barriers.* Resistance to data-sharing, problems integrating with existing systems, questions of data ownership, locating funding, lack of infrastructure and securing "buy-in."
- *Ideological Barriers.* The reluctance to move outside of "fortress corrections" and into community-based corrections.
- *Community Barriers.* Communities may fear being identified as having a high number of probationers for fear of declining property values.
- *Geocoding Barriers.* Missing data, difficult addresses and confidentiality issues associated with juvenile offenders raise issues when implementing a GIS system. Data and address problems tend to be heightened in rural areas.

Before an agency can reap the benefits of GIS, these issues and obstacles must be overcome. Careful planning, possibly including a cost-benefit analysis, needs assessment and careful review of the available technologies, agency and community buy-in and realistic expectations about what a GIS can do for an agency all are critical to implementing a successful program.

For more information about GIS, contact Joe Russo at 1-800-416-8086 or the Crime Mapping Research Center at (202) 514-3431; e-mail: cmrc@ojp.usdoj.gov.

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