From the Cell to the Streets:
GIS for Probation, Parole, and Corrections

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An Esri White Paper

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Introduction

With states facing the worst fiscal crisis in a generation and corrections costs consuming one in every 15 state discretionary dollars, the need to find cost-effective ways to protect public safety is more critical than ever.

—The Pew Center on the States[1]

The United States has a prison population of about 2.3 million, with one out of every 100 adults confined in some type of detention facility. The population of people on probation or parole in the United States has also grown to about 5 million individuals, or 1 in 45 adults. There are another half-million people employed in the US correctional system. If these populations were combined in one location, it would be the second largest city in the United States, only slightly smaller than New York City and more populous than 38 of the states.[2]

The costs associated with maintaining this population are significant: the United States spends an estimated $52 billion on corrections annually, a 303 percent increase over a 20-year period, easily outpacing budget increases for the same period.[3] These expenditures, coupled with the challenging economic times, have put a strain on federal, state, and local budgets.

For instance, in California, new legislation and budget cuts will spur the release of thousands of nonviolent felons from state prisons to local agencies. In Virginia, 10 prisons have closed since January 2009, resulting in hundreds of layoffs and overcrowding in the remaining facilities.[4] Similar measures have been instituted by many other states, including facility closures, employee layoffs, and program cuts.

Budget cuts have reduced prison facility staffing levels and increased probation and parole caseloads. For correctional managers and personnel, the challenge has become how to do more with less. Managing more offenders with fewer resources means agencies must work more efficiently without sacrificing public safety. Achieving this goal requires evaluating the nature of crime, offenders, and the criminal justice system. The current economic woes facing American corrections can be seen as an opportunity rather than a burden. Facility operations, corrections intelligence, and community corrections can all benefit from advances in technology. By redirecting funding that is

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[1] Pew Center on the States, *One in 31: The Long Reach of American Corrections* (Washington, D.C.: The Pew Charitable Trusts, March 2009), 1.

[2] Pew Center, *One in 31*, 1.

[3] Pew Center, *One in 31*, 11.

[4] Kinzie, S. "New Virginia Prison Sits Empty, at a Cost of More than $700,000 a Year," *The Washington Post*, May 30, 2011. Retrieved January 31, 2012, from http://www.washingtonpost.com/local/new-virginia-prison-sits-empty-at-a-cost-of-more-than-700000-a-year/2011/05/25/AGXZqwEH_print.html.

currently spent on disparate and incompatible systems, resources can be consolidated and offender supervision improved. This enables the highest quality of management while eliminating redundancy.

A Geographic Approach to Offender Management

Every offender, crime, or incident is somehow related to a place. *Place* can be identified as anywhere that has a geographic location and can be mapped, including crime locations, jail facilities, offender residences, employment locations, and areas where known associates can be located. Additional information can be added to these datasets including community resources, school locations, transportation routes, and crime and incident hot spots.

A geographic information system (GIS) is an integrated platform of hardware and software that collects, stores, manages, and integrates data. Information can be easily displayed and analyzed by people at all levels of an organization. The results are then used to make informed decisions. GIS technology seamlessly integrates with the existing information systems in place in an organization. By leveraging GIS data management, analysis, and visualization capabilities, corrections personnel will be empowered to better understand facility operations and offender management. After reading this white paper,

■ Senior corrections managers will understand the importance of GIS-enabled information systems to support the corrections mission.

■ Probation, parole, and corrections officers and civilian personnel will learn how GIS improves facility intelligence, offender management, and other corrections workflows.

■ IT personnel will understand how GIS technology is scalable from the desktop to the server to mobile devices and is available in the cloud.

While this paper includes extensive references specific to the United States, the same principles apply to offender management worldwide.

GIS for Corrections

The importance of GIS to the corrections mission begins with facility, inmate, and personnel management. A correctional facility can be thought of as a microcommunity with residents who have jobs, participate in commerce and recreation, receive visitors, require medical care, receive education, attend religious services, and often engage in criminal activity.

The infrastructure to support this community includes housing and care, adequate food services, medical capabilities, and all the ancillary services that are the legal rights of inmates. In addition, all aspects of the detention facility must be managed in a way that is safe and secure not only for the inmates but also for the staff and the community at large.

A GIS map of a residential community usually consists of a base layer on which address locations and event layers are mapped. The same holds true in the detention setting. A map of the facility layout is used as the basemap, with address locations consisting of the housing units, individual cells, and all other discrete locations within the facility. On top of this can be added data such as camera locations (including links to live feeds), water shutoff valves, and emergency equipment locations.

Once the basemap has been created, inmate locations can be added as an interactive layer that is constantly updated as changes are made in the records management system (RMS) or by real-time tracking through Global Positioning System (GPS) devices. For example, inmate #12-8952 is assigned to housing unit 7, cell #23, bed A. This is the inmate's home address. When that inmate leaves the cell for a court date, work assignment, infirmary visit, or other event, the movement is captured and noted in the RMS and simultaneously updated in the GIS, which then shows the inmate's new location on the map. Proximity alerts can also be set up so that when inmates enter restricted areas or come into the same area, for example, as rival gang members, the appropriate personnel are then alerted.

GIS also makes inmate information such as booking photos, current charges, demographic data, gang affiliation, and corrections history just a mouse click away. This type of data is crucial in helping corrections officers understand population dynamics and potential security threats as they occur. At any time, a staff member can instantly see where rival gangs are being housed, who is a suicide or escape risk, and which inmates have universal precaution hazards. In the event of a facility lockdown or emergency, GIS facilitates quick and efficient head counts by showing exactly where each inmate and staff member should be located. Rather than scrolling through a spreadsheet or tabular data, a map supplies requested information instantly in an intuitive, visual representation.

Also furthering the corrections intelligence mission is the ability of GIS to show exactly where incidents have occurred in the facility. Anything that is entered into the RMS can be tracked using GIS, including inmate assaults on staff and each other, use-of-force incidents, occurrences of graffiti, possession of contraband, and any other events and violations. This data can be used for early detection of potential problems and for identifying appropriate interdiction steps. Spatial and temporal analysis can also highlight recurring trouble spots that may require changes in policy or additional security measures.

Corrections analysis extends beyond inmates residing within the facility. Inmate interactions, including visitors, phone calls, and mail, can be monitored with the help of GIS. These outside contacts can be a great source of intelligence for facility staff and other law enforcement personnel conducting ongoing investigations for both incarcerated individuals and associates outside the jail or prison. Visitors or the origin of incoming phone calls to inmates can be mapped and visualized to create an analysis of all contacts and connections both inside and outside the prison. Likewise, events that occur on the street can easily lead to problems in the detention facility. For example, if two gangs are reported to have an issue outside a prison, staff may want to quickly identify the locations of members of those gangs in the prison to intervene before there is any further escalation of the conflict. GIS analysis helps identify these problems by linking different datasets and providing sophisticated analysis tools that are easily used by officers and civilians.

GIS for Probation and Parole

The need for offender supervision does not end with release from jail or prison. Of the five million offenders on either probation or parole in the United States in 2011, the vast majority are sentenced to active supervision, meaning they are required to have regular interaction with their supervisory agency. Fifty-one percent of probationers were felons, and 19 percent were violent offenders.[5] Recidivism rates among parolees remain high,

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[5] Glaze, Lauren E., Thomas P. Bonczar, and Fan Zhang, "Probation and Parole in the United States, 2009," *Bureau of Justice Statistics Bulletin* (December 2010): 30–31.

with 60–70 percent returning to prison within three years.[6] Probation and parole officers are responsible for the management of offenders as they are released, acclimated, and then supervised in the community. The supervision of these offenders, under the auspices of community corrections, is increasingly used to reduce prison populations. The cost, however, is an extra burden on already strained local and state agencies tasked with the management of these supervision programs.

With GIS and a system of place-based supervision, officers can be assigned caseloads based on geospatial information that places the officer in the communities where the offenders live. GIS can manage the probation and parole officer caseloads, allowing enhanced tracking of offenders, workplaces, and treatment facilities with a geographic overview of the neighborhood and associated risk factors. For example, offenders convicted of sex crimes with residency restrictions can be easily managed to ensure that proper proximity from schools, parks, and day care centers is maintained.

As the probation officer, case manager, or supervisor schedules visits, he or she can use GIS to improve efficiency by scheduling clients based on geographic location. By clicking the digital map that shows probationer residence locations, the officer can see which probationers live near each other. This helps schedule visits within the closest proximity to one another. The officer can also quickly obtain information about each probationer, including name, charges, known associates, gang affiliation, and identifying photographs. Neighborhood intelligence can quickly be viewed, including risk factors such as known drug houses and gang territories.

If probationers violate the terms of their probation, alerts can be set up to show the officer who is in violation, the violator's last known address, and locations of friends and family where the offender may be located. These alerts can also be shared with neighboring agencies and jurisdictions. With integration of mobile GIS technologies, officers who conduct field interviews with offenders can immediately notify the probation officer of the probationer's identity and the time, location, and nature of their interaction with the client using a handheld device to instantly transmit the data.

Over the past several years, increasingly tough legislation has been enacted in the United States to protect families and the public from convicted sex offenders. Laws such as Megan's Law require sex offenders to register with the appropriate agency when they change residences. This information is mandated to be made available to the public. Jessica's Law prohibits sex offenders from living within a certain distance of a school, day care facility, or public park. GIS is used to enforce these laws by allowing parole agents to actively track where convicted offenders are living in relation to restricted locations. Sex offenders who want to move must alert their parole officers. Officers can verify that the offenders are outside the restricted zone. The enforcing agency can then make alerts available to residents within a geographic area if an offender has moved into their area. High-risk sex offenders can be tracked with GPS monitoring in real time and alerts set up warning the officer of restriction violations.

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[6] Langan, Patrick A., and David J. Levin, "Recidivism of Prisoners Released in 1994," *Bureau of Justice Statistics Special Report* (June 2002): 1.

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GIS Improves the Corrections, Probation, and Parole Enterprise

Esri® GIS software provides an enterprise platform that works on the desktop, in client/server environments, on mobile devices, and in the cloud. This enterprise capability means GIS can instantly fit into any existing information technology infrastructure. It also means that users can begin immediately deploying GIS and easily expand its use because of its scalable architecture. The ability to take advantage of GIS using different computing environments means every person working in any department can benefit from high-powered computer mapping analysis and visualization.

Desktop

Desktop GIS provides the ability to manage, display, query, and analyze patterns in corrections. It joins traditional analysis tools, such as spreadsheets, databases, and graphics, with facility and community maps for a completely integrated analysis system. Officer safety risks, prison population trends, and other potential security threats can be quickly identified by the assigned analyst or officer and responded to in the appropriate manner. It can operate as a stand-alone solution or be part of a larger organizational solution. Some of the functionality that it supports includes the following:

■ The ability to export maps as georeferenced PDF documents that have interactive layers and features for wide distribution

■ Model-building tools that facilitate the automation of everyday tasks and workflows

■ Feature tools that link maps, graphs, and charts for the performance of exploratory spatial analysis

■ Spatial statistics tools that enable the analyst to perform statistically significant hot spot analysis of spatial patterns

Server

Server GIS software connects people with geographic information through web applications and services. Corrections personnel can publish their analytic products through a web-based GIS common operating picture (COP) that can be securely shared through an internally hosted intranet server connection or through web-based collaboration tools such as Microsoft's SharePoint technology. This improves collaboration and information sharing throughout the organization and provides a comprehensive information management workflow.

Capabilities include the following:

■ Web mapping services and applications that can be delivered to web, desktop, and mobile users

■ Leveraging existing IT architecture by integrating GIS server and spatial data with other enterprise systems such as computer-aided dispatch (CAD) and RMS

■ Highly customizable tools to fit every workflow by combining geographic content with GIS functionality

■ Secure and centralized management of data, applications, and services

Mobile

Meeting mission demands often requires the ability to provide a mobile work force with information in the field. Probation and parole officers are frequently in the field, and the

sharing of intelligence is a priority in community corrections. Corrections intelligence frequently needs to be shared with other law enforcement agencies, including be on the lookout (BOLO) bulletins, law enforcement- and community-directed threats, and other crimes and suspicious activity. Law enforcement officers on the street, regional gang units, and detectives can have access to corrections intelligence through their laptops, PDAs, or mobile phones. Information collected in the field can be shared throughout the organization for increased awareness, including field interviews, GPS coordinates, and digital photos that can be directly integrated into the GIS.

Online Maps and Data

Map and data products, many of which are now available via the web, help agencies better understand their jurisdictions and offenders using a range of ready-to-use, high-quality data for GIS visualization and analysis. Basemaps; imagery; and demographic, consumer, and census data can help complete a comprehensive intelligence picture. With these data tools, agencies can

■ Choose ideal deployment locations for probation offices and services

■ Profile high-risk locations and offenders within an area

■ Analyze community factors that may contribute to high recidivism and offending rates

■ Forecast future trends that may affect caseloads and workflows

Conclusion

GIS provides support for all aspects of corrections, probation, and parole. It supplies interoperability between disparate systems, including CAD and RMS, and other data sources. Information is quickly processed and disseminated as actionable intelligence to inform personnel at all levels, from the warden or sheriff to the frontline officers and analysts; GIS supports all workflows. Corrections GIS allows flexibility and can be implemented on a variety of levels or as a complete system.

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Esri inspires and enables people to positively impact their future through a deeper, geographic understanding of the changing world around them.

Governments, industry leaders, academics, and nongovernmental organizations trust us to connect them with the analytic knowledge they need to make the critical decisions that shape the planet. For more than 40 years, Esri has cultivated collaborative relationships with partners who share our commitment to solving earth's most pressing challenges with geographic expertise and rational resolve. Today, we believe that geography is at the heart of a more resilient and sustainable future. Creating responsible products and solutions drives our passion for improving quality of life everywhere.

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