GIS for Real-Time Crime Centers

An Esri® White Paper
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Contents   **Page**

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Executive Summary

Law enforcement professionals are continually implementing new technologies that improve how they serve the public. As different types of hardware and software solutions are deployed in a police agency, it becomes increasingly difficult to integrate these tools. An agency can quickly become overwhelmed with large volumes of data.

The implementation and use of all these new technologies and data, including mobile devices, computer-aided dispatch (CAD) systems, records management systems (RMS), automated vehicle location (AVL) systems, license plate readers, and remote camera systems, can become so consuming that we forget the reason we purchased them (i.e., to improve capability, provide public protection, and reduce officer risk).

The recent fiscal climate has led many police agencies to question and reexamine their current technology investments. Harnessing existing capabilities and integrating them into searchable, shareable, and authoritative tools, such as operational dashboards, are the answers. These visual solutions can provide relevant data to the entire organization with customizable tools that allow information to be queried, analyzed, and shared through desktop, web, or mobile platforms.

To accomplish this quickly, real-time crime centers (RTCCs) were developed. RTCCs are usually placed within a police agency where there is access to dispatch, command, and other key personnel. An RTCC allows enforcers to do the following:

- Access an operational viewer that incorporates various data feeds and displays them on an easy-to-understand map of the jurisdiction

- Collect, store, and manage data about crimes, offenders, suspects, resources, and critical infrastructure

- Perform analysis to understand relationships between crime-related data and risks to help develop actionable intelligence on vulnerabilities and potential consequences

- Develop more effective response and planning

- Get information to and from the field through mobile applications

- Disseminate information to the public or to other law enforcement agencies.

RTCC staff are able to perform the above functions in real time. Using GIS as a scalable platform, they can quickly and easily send and receive information from the field. GIS integrates different systems and data sources, displaying the results on a digital map. GIS is used to collect and store the results, which can be further displayed and analyzed on maps independently or within other applications such as CAD, RMS, crime analysis solutions, or commercial products like Microsoft Office.

The purpose of this paper is to discuss how GIS can be implemented and used in an RTCC to do the following:

■   Understand critical exposures and vulnerabilities

■   Identify and prioritize mitigation requirements

■   Implement and maintain mission-specific situational awareness before and during first response incidents

■   Share data, information, and situational awareness with other organizations and responding agencies, the public, and public safety personnel in the field

■   Collect geographically referenced data from all types of mobile devices in near real time

GIS for Real-Time Crime Centers

By implementing GIS in an RTCC, a police agency can leverage a complete platform for managing and improving real-time law enforcement response and public safety. Geographic information systems were built specifically to collect, analyze, and disseminate information in an understandable way: through a map. Crime can be more accurately monitored, response tactics and investigations improved, and daily law enforcement tasks streamlined. These systems can leverage city, county, state, or federal GIS infrastructures where appropriate and take advantage of hundreds of datasets that before were inaccessible or unusable. The results are better decision making based on validated information in support of agency priorities. The RTCC concept supports multiple far-reaching missions ranging from immediate reaction to priority calls for service to long-term investigative support for active cases. GIS implementation in an RTCC supports these missions by providing multiple viewers that can access common data.

Map Viewers

Command/Executive Dashboard

The Command Dashboard is a viewer that provides situational awareness for decision makers and command staff using an intuitive graphic interface. This easy-to-manage viewer is always running and provides a high-level overview of a jurisdiction and its current status. It is customizable and can include relevant information such as crime data, offender locations, asset location, automated vehicle location, and critical infrastructure. Additionally, other data that may impact the law enforcement mission, such as major hazard feeds (weather, earthquake, tsunami, hurricane, etc.), can also be connected to CAD (priority calls, vehicle locations, hazmat spills, etc.) and viewed using the dashboard to show high-impact events in the community.

Intended users are command and management staff.

Sample tools

■   Crime Data Viewer: Shows officer, suspect, and criminal activity reports. Can also include agency assets and critical infrastructure (Incident Management Toolset/Editing Layer [redline incident data])

- Active Operational Data Viewer (Special Weapons and Tactics [SWAT] events, search warrants, hostage situations, missing child searches, parades, etc.)

- Reporting Dashboard: Number of people and Critical Infrastructure and Key Resources (CI/KR) within an area of impact (warrant service, barricaded subjects, environmental hazard, etc.)

- Basic Information Viewers: Important community events (very important person [VIP] protections, gang members/hangouts, active warrants, etc.) to include such items as road repair and utility issues

Real-Time Crime Center Viewer

The Real-Time Crime Center Viewer is designed for analysts providing live information to field officers responding to priority calls. The viewer focuses on display and management of ongoing situations and responses. It contains the largest range of tools and data as well as the most relevant information about incidents and the local environment. The viewer provides toolboxes for specific functions such as analyzing drive times; finding nearby parolees, probationers, or warrants; tracking police vehicle locations; and displaying active calls for service or historical data from the records management system. It also includes subsets of data that can be switched on or off depending on the type of call and information needed.

Intended users are operations staff that monitor priority real-time calls for service; this may include supervisory staff such as duty lieutenants.

Sample tools

- AVL feeds, CAD feeds, and other real-time data displays

- Find Nearby tool

- Tools to calculate drive times and likely left-the-scene routes

- Integration points for live video cameras, license plate readers, or other local intelligence

- Incident Management Toolset/Editing Layers (redline incident data)

- CI/KR Management Module allows for update and status of CI/KR locations

Task Force/Specialized Units/Agency Divisions Viewer

The Task Force/Specialized Units/Agency Divisions Viewer is focused on the management and needs of specific units. Gang or narcotic units have differing day-to-day needs for data management and examination than patrol officers or a property crimes detective. This viewer includes access to relevant data for specific assignments. Warrant or offender management units may need to know what resources are available to them, including nearby officer locations and availability, and location and routing analytics to help them be more efficient. Patrol commanders may be interested in AVL data as it compares against calls for service. This viewer also provides data on area transportation networks for optimum routing and movement of police vehicles, as well as the status and location of officers in the field.

Intended users are police command, specialized units, and so forth.

Sample tools

- AVL or License Plate Recognition (LPR) data

- Specific data such as outstanding warrants, process services, and time-sensitive data such as sex offender or parolee checks

- Resource Management Widget (update, task, status, etc.)

- Find Nearest Resource/Routing Widget Combination

- Establish Roadblock/Supply Route Tools (change and monitor supply route attributes)

- Event planning and management tools

- Camera feeds

- GPS locators

Public Information Viewer

The Public Information Viewer provides the local community with data about law enforcement activities. This can include planned events (such as parades, road closures, etc.) or crime statistics (missing children [Amber Alert], police blotter, crime data, etc.). This viewer is configured to be lightweight and is customizable to control the information provided to the public.

Intended users are the general public.

Sample tools

- Crime statistics for a neighborhood

- Am I Affected tool (input address and show whether location is in a planned security zone for a parade, local event, or emergency situation)

- Citizen Engagement: Report tips and leads (graffiti, broken windows, narcotic activity, etc.)

Solution Overview

GIS software provides comprehensive features and functionality for secure data management, analysis and planning, field mobility, situational awareness, and citizen engagement. It enables data to be transformed into actionable intelligence that can then be used for decision making and policy execution. Using GIS modeling and analysis tools makes the most of data to help understand what it means and take better action.

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GIS software and data components, maps, and applications, along with training and support services, must be able to be customized based on specific organizational requirements.

GIS must also easily integrate and connect with other hardware and software providers. This provides easy application and data exchange at a cost savings.

Data   Data is an essential component of a GIS implementation. GIS easily incorporates various data resources to use with GIS software to support application requirements. Many data resources that can be incorporated into a GIS include the following:

- Crime data

- Accident data

- Calls for service

- Connection with other databases, including Microsoft and many other software packages that use large flat files (comma separated, fixed width, etc.)

- Video feeds

- AVL data

- LPR data

- Offender location data

- Local datasets, including political boundaries such as beats, demographic blocks, and jurisdictional boundaries

- Most any type of satellite imagery

- Connectivity with other databases (Sometimes, critical law enforcement data is contained in local databases such as SQL® Server. A GIS should be able to connect to databases that are in either read only or read and write configurations.)

Next Steps   GIS can be used to transform any police agency into an organization that is prepared to respond to any situation. By employing a GIS-enabled solution, an organization of any size can and will be ready to respond to any threat, at any time.

Before deploying any GIS, an organization should take the time to review its current needs and capabilities and desired future capabilities. While the law enforcement mission in understanding real-time crime response is different than that of fusion centers and high-intensity drug or intelligence centers, the technology foundation and platforms are similar. Building an RTCC on these standards improves information sharing and event coordination. These resources include the following:

Geospatial Standard Operating Guidance for Multi-Agency Coordination Centers, available at http://www.napsgfoundation.org/attachments/article/119/NAPSG-SOG-V-2 -Final-pdf.pdf (Note: These standards are written for multiagency coordination centers [EOC, DOC, or MOC] but are applicable to RTCCs and will improve an agency's ability to coordinate RTCC efforts and information with emergency operations centers with differing missions.)

A Quick Guide to Building a GIS, available at esri.com/library/brochures/pdfs/napsg -guide-bro.pdf

Implementation Road Map Development

Implementation of a GIS for RTCCs—A road map must be developed to help ensure a successful system. One must identify, prioritize, and budget for the following:

■ Information products (maps and applications)
■ Training and staffing
■ Data and information systems that need to be acquired, developed, or integrated
■ Computer infrastructure
■ GIS software

Systems Infrastructure Best Practices

It is important that adequate computing and network infrastructure is allocated to support GIS for RTCCs. As part of the road map for development, a GIS must review existing computing environments and business systems to ascertain best practices for implementation. Below is a sample conceptual architecture that will support the agency:

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Conclusion   Esri® ArcGIS® software is a complete platform for standing up an RTCC. It's affordable and scalable; fits into existing IT; and brings together data from many different sources into an easy-to-understand, smart interface. With ArcGIS as the RTCC platform, an agency's systems and data sources are transformed into real-time intelligence tools that quickly and reliably inform field officers before they arrive on-scene. ArcGIS cutting-edge technology integrates with CAD systems and RMS; connects many other types of software packages; and can incorporate camera feeds, LPR data, AVL data, and many other nontraditional data sources. This flexibility enables Esri to meet the needs of any agency, regardless of size or budget. Beyond the organization, Esri also promotes data sharing and community partnerships, fostering greater collaboration and problem solving both locally and regionally through its extensive partner network and user communities. This network of law enforcement users implementing a common platform provides knowledge exchange and best practices. Through the powerful combination of knowledgeable staff, a ubiquitous platform, valued partners, and strong user support, Esri provides what is needed to quickly get up and running with a complete RTCC. It also means agencies will have a long-term partner in Esri that will work to help them succeed.

For further information on GIS for Real-Time Crime Centers, please contact the public safety industry team at publicsafetyinfo@esri.com.

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