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Crime Mapping News



A Quarterly Newsletter for Crime Mapping, GIS, Problem Analysis, and Policing

Volume 7 Issue 4
2007

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The topic of this issue of *Crime Mapping News* is multijurisdictional crime mapping efforts. This issue begins with an article about the organization, development, and implementation of a new regional crime mapping information system in San Diego, California. The second article describes the development and application of a regional data-sharing initiative in Maryland. The third article highlights the events at a recent mapping conference in Pittsburgh, PA. The final article is part of a new series called the *Crime Mapping News Spotlight* where we highlight a particular program, crime analysis unit, or special event involving GIS, crime mapping and/or crime analysis and provide a brief snapshot of the key components, ideas, or strategies. This issue's spotlight is on a professional GIS certificate program at George Mason University in Northern Virginia.

Crime MAPS: Evolution and Revolution

by Julie Wartell, Crime Analysis Administrator, County of San Diego District Attorney

From Where Did MAPS Come?

Brief History

San Diego County's Automated Regional Justice Information System (ARJIS) implemented the Interactive Mapping Application (IMA) in 1999. It was the first multi-agency, interactive crime mapping Web site in the country. Geographic information systems (GIS) have been used within individual law enforcement agencies in San Diego County for over twelve years. The San Diego Police Department (SDPD) was instrumental in the creation of IMA, and was a pioneer in 1996 in putting crime maps on the Internet.

ARJIS IMA soon became a model for others wanting to create crime maps on the Internet. The implementation was noteworthy as a unique model for law enforcement and for providing the capability of making regional, interactive crime maps available to the public. In 2001, ARJIS took the added step of evaluating the effect of IMA on the community and public safety. This evaluation included over thirty focus groups and community meetings to gather input and learn what the various audiences desired for a re-designed application. Using the results of that evaluation and a thorough planning process, ARJIS was poised to implement IMA2—a law enforcement-only, interactive, crime-mapping application running through the secure ARJISNet.

The primary goals of the San Diego Regional Crime Mapping Project—which was later named San Diego County Regional Crime Mapping Application for Public Safety (MAPS)—were to expand and enhance IMA for the public and create IMA2 (MAPS-LE) for law enforcement personnel. This project brought local, state, and federal law enforcement agencies, as well as academic institutions and the private sector, together to create an application that would best serve the community. Specifically, the project was designed to accomplish the following:

- Increase the functionality (querying and reporting capabilities) of IMA;
- Greatly expand the amount and detail of data from IMA;

To view the *Crime Mapping News* in full color, visit the Police Foundation or COPS Office Web sites at www.policefoundation.org or www.cops.usdoj.gov.

- Allow users to map and analyze across jurisdictional boundaries, which allows for increased communication and regional problem solving; and
- Create a means for community members and law enforcement personnel to do crime mapping with a sophisticated but user-friendly Internet application.

In the fall of 2003, San Diego County was in an ideal position to move forward with MAPS. The work that had been done in preparation for a new IMA and IMA2—SDPD's crime mapping infrastructure development, the provision of a project manager from the district attorney's office, and the funding from the National Institute of Justice—all set the stage for a unique, cutting-edge, local project.

Getting Started

A Project Management Committee (PMC) was created to include members from many of the stakeholder agencies, in particular community members, cops and analysts from local law enforcement, and GIS experts from the local San Diego Association of Governments (SANDAG) and local universities. The PMC initially met to determine existing resources (data, money, expertise) and review project requirements.

The draft requirements were a product of a wide variety of input from a number of sources: brainstorming meetings and communication with a planning group representing several ARJIS agencies; results of a two-month online survey of law enforcement personnel conducted on ARJISNet; a demonstration of an ARJIS beta mapping application by the U.S. Border Patrol; informal discussions with several vendors; several documents created by SDPD; and relevant publications in the crime mapping field. A Request for Proposal was created and distributed in September 2004, the vendor team was selected in December, and our kick-off meeting took place in January 2005.

Committee Work

All ARJIS agencies and other stakeholders were once again invited to participate in the project. Volunteers selected one of three committees on which to participate. The Policy Committee had management-level representatives who oversaw the policy-oriented and political issues. The Technical Committee was in charge of hardware, software, and infrastructure elements. The User Committee—consisting of analysts, cops, and community members—handled everything from the look and feel of the application to the choice of data. One of the initial rules of the project was that if you do not show up at meetings or provide input when asked, you do not get to impose changes after the fact. Fortunately, this rule was imposed only a handful of times.

While the Policy Committee met only a few times during the project, the Technical Committee had several meetings at the beginning, and then a modified Technical Group spent a great deal of time getting the completed

application to work in the existing infrastructure. The User Committee had numerous meetings, and spent additional time on topics as far ranging as Web page color schemes to symbology, wording of the HELP file, and time selection criteria. The lead application developer was extremely patient, helpful, and creative in working with the User Committee on the thousands of options for this complex system.

How Does It Work?

Flow

The importance of the application flow—from what the user initially sees on the first page, to how and when to get to HELP, to making and modifying a map—is extremely important. All applications need a disclaimer, and MAPS was able to use a modified version of the existing IMA disclaimer. Once the user accepts the disclaimer (I recommend looking at as many as possible if you are creating one for your site), the ABOUT page follows. This way, users should be able to find out everything they want to know and more about the system. One of the community members from the User Committee wrote the majority of HELP and ABOUT so it would accurately reflect the community perspective.

While HELP provides tips on what happens when you click buttons and which screens to go to next, ABOUT provides information on the origin and types of the data, incident attributes, more details about the time periods, and why the program should not be used for official statistics. Both HELP and ABOUT include contact information for technical problems, as well as questions about crime in each jurisdiction. HELP and ABOUT are available on all screens once the user enters the application.

The application consists of three query screens and the resulting map screen. The query screens are Location, Incidents, and Time Frame. The user is not able to advance to the next screen without filling in criteria. Once each screen is complete, a map can be generated. After a map is generated, any one or more of the previous screens can be changed with the remaining screens keeping the original criteria.

Content and Function

Location, Location, Location. Like real estate, crime mapping centers on location (see Figure 1). Because of the cross-jurisdictional aspect of the application, logic led us to use location as the first page. In addition, the types of locations (schools, neighborhoods, etc.) varied from one jurisdiction to another. Location types were selected by the User Committee through a combination of a wish list and what data were available. Most of the base layers (jurisdictions, streets, hydrology, schools, etc.) are maintained by SanGIS, a local GIS consortium, or SANDAG. San Diego County is fortunate to have a large variety of countywide GIS data. For instance, everyone wanted to include parks but the data layer was not good, so we are working with SANDAG to create a new, countywide parks layer for MAPS (and to make available to other SanGIS users).



Figure 1. Query screen used to select general location and location types.



Figure 2. Query screen used to select the type(s) of incidents.

There was a great deal of discussion on what types of incidents should be included. The list ended up with all Part 1 crimes, some other crimes, selected arrests and citations, and traffic collisions and citations (see Figure 2). The plan is to add selected calls-for-service data, such as noise and disturbance, which do not typically turn into official crime reports. The only crime type that induced further meetings and discussions, and which the ARJIS chiefs ultimately decided not to include, was domestic violence.

One of the key points that came out of the earlier evaluation was that 60 days (the current IMA) was too short for many of the community users. We settled on one year, but limit the user to 91-day time frames for performance and readability. In addition, we felt it was important to allow the user to choose any time range and day of the week. Many communities are happy seeing any crime-mapping data, but one thing we have learned in San Diego is that our residents have high expectations due to the fact they were provided basic maps ten years ago and more complex and interactive maps since 1999.

After the user has selected the location, incidents, and time period, a map can be generated (see Figure 3, next page). In addition to the actual map, there are several functions beyond the traditional zoom and identify. Totals provides numbers of each type of incident in the legend. SELECTION SUMMARY allows the user to see what location, incident types, and time period are chosen. At any point, the user can

(Continued on page 4)

Note from the editors: The opinions expressed in the articles of this newsletter are those of the authors and do not necessarily reflect the views of the Police Foundation or the COPS Office. In addition, only light editing has been done in order to keep each author's voice and tone.

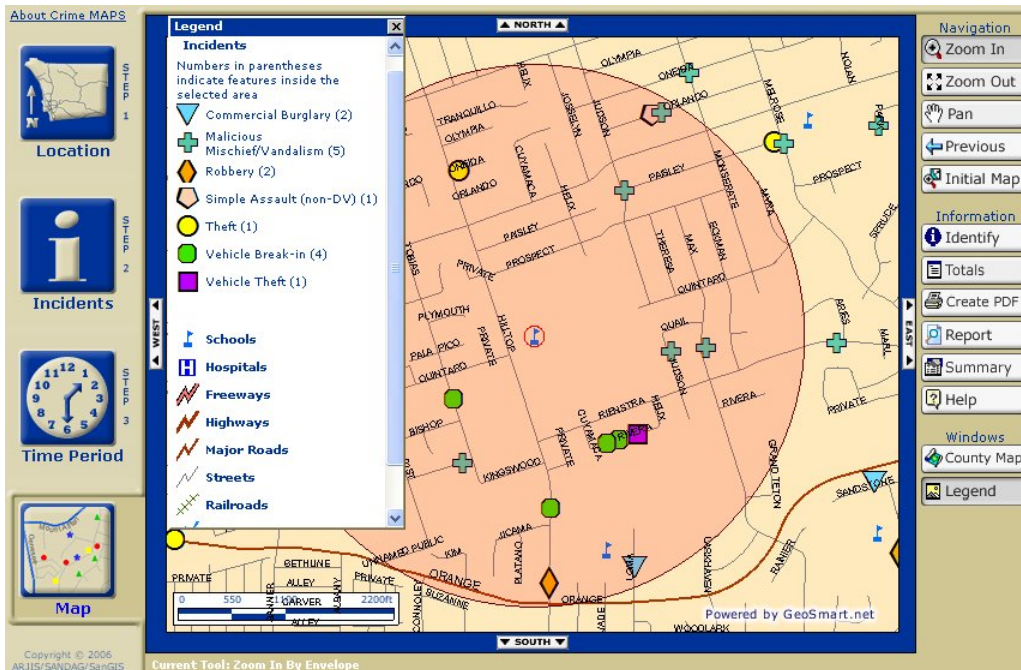


Figure 3. Map showing results of query selections.

change one or more of those options and the others will remain. The report function offers the user a sortable, printable list (see Figure 4); and the printed map button generates a custom-titled pdf.

Where do we go from here?

Next Steps for MAPS

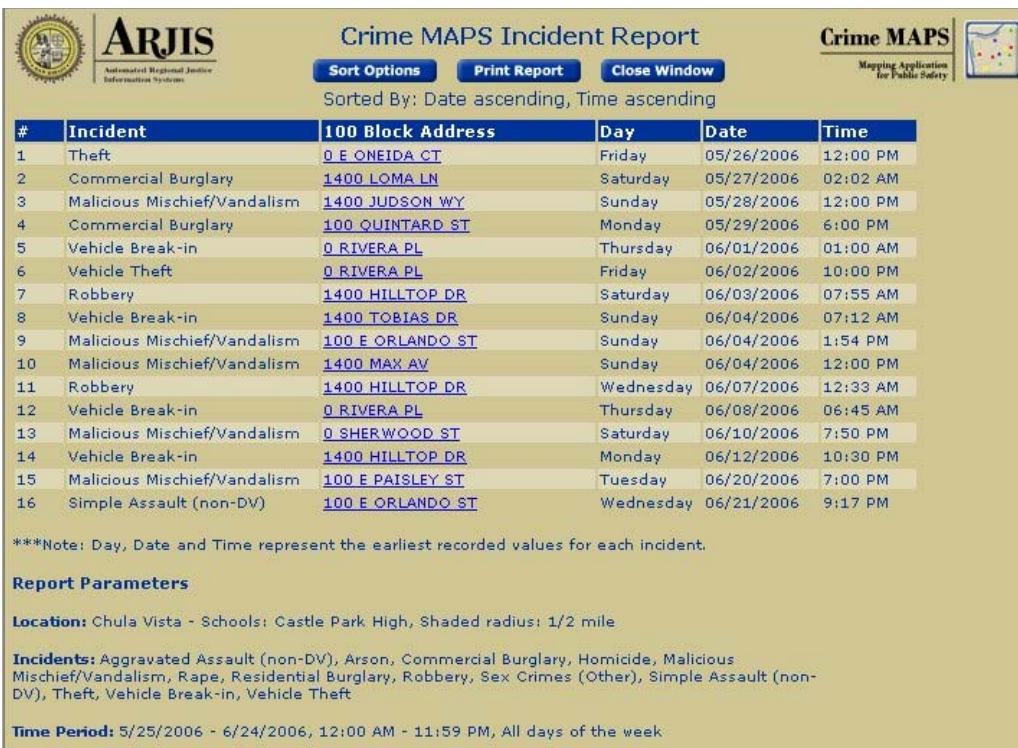


Figure 4. Printable report based on query selections.

Now that we have accomplished our goal of creating a user-friendly, versatile, and dynamic application, we need to get the word out. This will be done through demos and training of key personnel in the law enforcement agencies, such as the sheriff's department's twenty-five Crime Prevention Officers, as well as to community leaders and the general public.

Even as we planned for the release of version 1.0, we already had a list of enhancements for the next version. Some are as simple as adding more tourist attractions that were not in the original list, while the ultimate improvement is completing a related

application of a crime-email distribution list. Currently, SDPD has this functionality with eWatch, which is connected to the old IMA. We plan on expanding eWatch countywide and linking it to the new MAPS.

In August 2006, planning began for MAPS-LE. Using a secure intranet, MAPS-LE will provide law enforcement with a much richer dataset to be mapped and analyzed. New information will include more detailed local crime data, county and state data (such as probationers and parolees) that is restricted to law enforcement personnel, and links with

graphic data such as mug shots and orthophotos. All 71 ARJIS agencies will be able to access, map, and report on all multijurisdictional ARJIS data (such as field interviews and outstanding warrants that are not available to the public). In addition, a variety of other criminal justice, geographic, and demographic data will be integrated into the system.

The ultimate goal of MAPS will always be to serve the needs of the community and law enforcement. As the needs change and technology improves, we are hoping that we can adapt the applications appropriately.

Future of Crime Mapping on the Web

There are many benefits of Internet crime mapping,

especially regional applications. The primary benefit is the capability of information sharing and looking at criminal justice related information mapping across jurisdictional boundaries. Cross-jurisdictional mapping can aid in interagency communication, intelligence gathering, strategic planning for resource allocation, homeland security, as well as, crime control and prevention efforts. Regional efforts also offer economies of scale, shared expertise and resources, and an improved analytic capacity.

In terms of challenges, most regional, multi-jurisdictional projects include issues of multiple organizations with differing goals and objectives, privacy and security concerns, and the complexity of integrating data and systems. If a cross-jurisdictional infrastructure already exists, many of these obstacles can be avoided in establishing a regional mapping project. Specific challenges to MAPS included limited monetary resources, differing priorities within partner organizations, and existing information technology vendor associations.

Although MAPS and other crime mapping web sites are still evolving, there has definitely been a revolution not only in thinking about sharing crime mapping data on the Web but also the technology that enables it. In 1996, when the San Diego police began sharing crime maps on the Web by putting up monthly static maps, we were considered revolutionaries. Amazingly, ten years later, there are only 100-125 public Web sites that have some type of crime mapping. The use of GIS in law enforcement has definitely grown, and the technology is available and not cost prohibitive, but politics and personal beliefs continue to limit the open sharing of crime data and maps. If we in law enforcement want to reduce and prevent crime, we need to partner with the community, which includes providing as much information as is legally and feasibly possible. Crime mapping on the Web is an excellent way to help accomplish our goals. Feel free to check out the interactive site at www.arjjs.org (click Crime Maps).

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Communications Director

RCAGIS in Baltimore and Surrounding Areas: Cross Jurisdictional Data Sharing On a Grassroots Level

by

Agent Jeffrey Cooper and Major Paul Herman, Baltimore City Police Department

In the early 1990s, Baltimore metropolitan area police departments had one of their first substantial successes in regional crime data sharing with the Regional Auto Theft Task Force (RATT). As a result of the regional sharing of offender and incident data, metropolitan police assets were deployed in a collaborative, deliberate, and highly successful way that dramatically illustrated the effectiveness of regional cooperation in attacking a particular crime problem. By pooling information and resources, police initiatives were made more seamless and effective. Focusing police decision makers on one set of data enhanced their ability and willingness to focus on the same set of problems and to act as a single provider of solutions.

The use of computerized mapping to solve a series of robberies occurring between Baltimore City and Baltimore County soon emerged. The initial successes in data sharing and regional crime analysis provided evidence to reinforce what crime analysts have long known: the effective analysis of incident and offender data multiplies in proportion to the size of the dataset being analyzed. Furthermore, because offenders do not commit crimes solely on the basis of geographic boundaries, it is important to analyze data across multiple jurisdictions in order to effectively identify patterns, trends, and chronic conditions.

The logical evolution of these collaborative efforts was to institutionalize data sharing and improve the analysis of those data by the use of analytical programs. Thus began the concerted effort to create a systematic data-sharing initiative called the Regional Crime Analysis System (RCAS). In 1994, a newly formed committee used existing regional models to develop a framework for RCAS. From that point, committee members helped develop the software and the administrative procedures for the system.

Through the years, numerous local agencies worked on contributing data to a centralized database and developed common tools to analyze the data on a regional basis. By the end of the decade, programmers working for the U.S. Department of Justice developed the first version of the Regional Crime Analysis Geographical Information System (RCAGIS) to analyze and geographically map the pooled data. Lessons learned during the creation and maintenance of a centralized dataset now serve to guide other agencies contemplating similar regional data-sharing initiatives. At that time, member feedback pointed out a lack of technical support, an inability to extract data from a central server, and the unwillingness of agencies to contribute to a dataset plagued with access issues. The manner in which the

Baltimore metropolitan region addressed those concerns provides useful lessons for continued improvement of the process.

How to Share Data Across Jurisdictional Lines

Obtaining the required operational and managerial buy-in is the relatively easy part of achieving the final goal of multijurisdictional data sharing. It is the logistics of actually achieving the desired goal that is a far more complex and labor-intensive process. Of course, many questions surface when confronting the notion of effectively sharing data across a region containing many police jurisdictions. Different jurisdictions employ different data structures, field types, and code values. How can these variances be reconciled? How can the fields be easily mapped to one another? Most importantly, how can the data be transferred over distance with any kind of speed?

There are two schools of thought in the field of regional data sharing. The first can best be described generically as data warehousing, where one common dataset is agreed upon and all tables and field values are standardized. Each jurisdiction contributes its data by either keying it into a central database using a standardized interface, or by converting their existing data into an agreed upon format prior to importing it. In the data warehousing method, data are converted and "pushed" into a common database for extraction and analysis.

The only other practical method of data sharing is data mining. This method maintains data in their native format at the local agency, and local servers manage the information exchange through the creation of data models. These data models contain all the logical mapping of data in pre-formatted instructions. Thus, remote data is "pulled" into a virtual dataset for extraction and analysis.

Each approach has its strengths and weaknesses, and the employment of one system does not preclude the employment of the other mode of data sharing. In fact, a warehouse can be created as a data source in a data-mining model. The Baltimore City and Baltimore County police departments use both data mining and data warehousing as a means by which their information is exchanged and internally accessed. For the purpose of the RCAGIS mapping application, however, the RCAS group currently uses a modified version of the original data warehouse method. This modified version has proven to be a significant upgrade over the former, more centralized type of data warehousing.

Old Data Sharing vs. New Data Sharing

Many of the past deficiencies of RCAGIS can be traced to the centralized nature of the old established system. In the past, dial-up bulletin board technology was used to manually upload the data to a server hub funded and housed by the Washington/Baltimore High Intensity Drug Trafficking Area (HIDTA). Agencies then downloaded and integrated one large dataset locally or queried directly from the centralized database. The

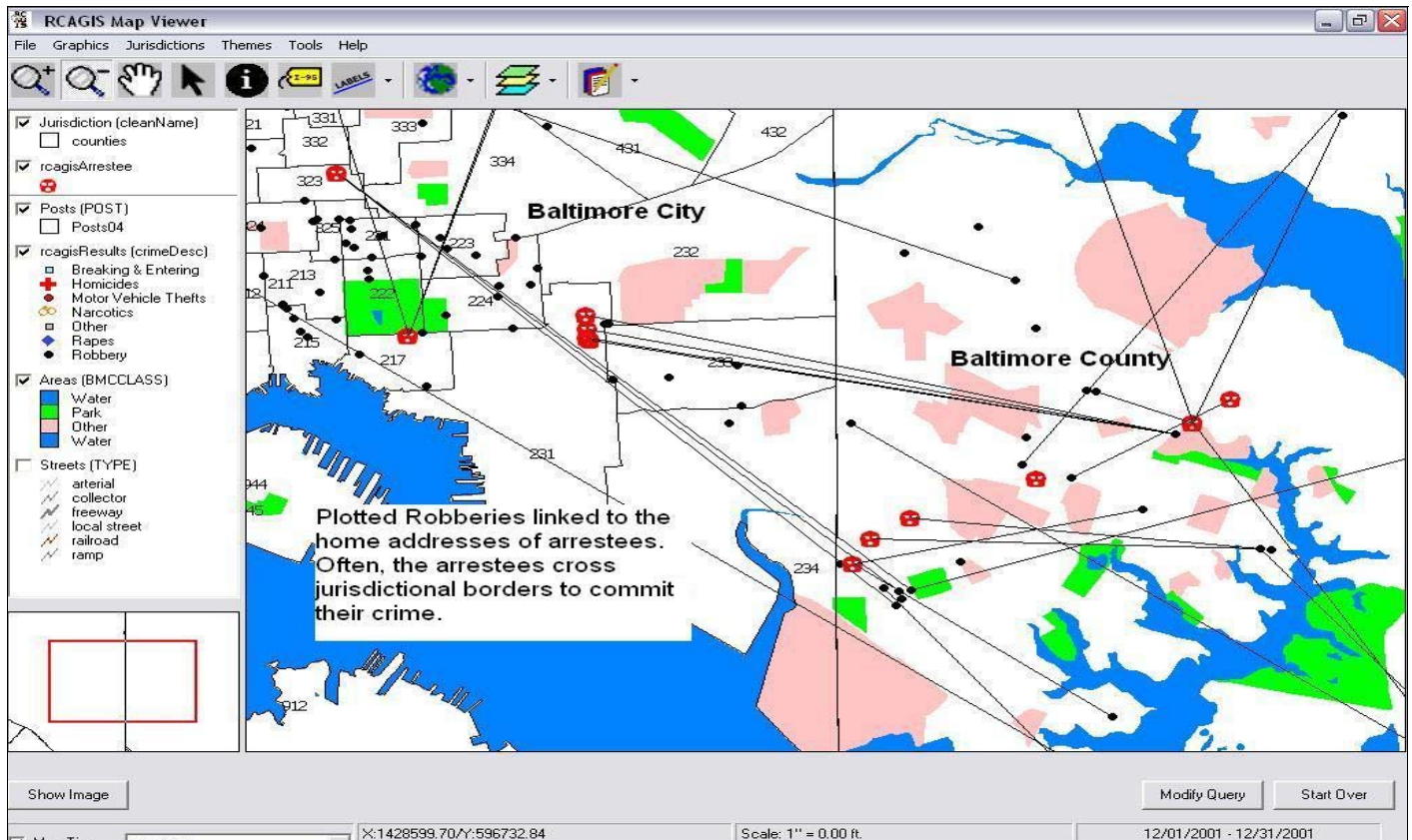


Figure 1. RCAGIS Map Viewer displaying the home addresses of arrestees (red masks) linked to the locations of the robberies they committed (black dots). Criminals do not always reside in the jurisdiction where they commit crime. RCAGIS enables the user to link people to crime, stolen vehicle locations to recovery locations, and any set of crime with matching attributes without regard to jurisdictional limits.

data structure itself was designed by the RCAS group and therefore was unique to the Baltimore metropolitan area.

This system proved to be somewhat inefficient and caused some frustrations for contributing agencies that found that uploading the data to a central server created a feeling that they had no control over the data. They could put the data in but discovered that it was difficult to get the data out. In addition, there was no one to call if problems arose with the system or the connection.

Currently, a more grassroots approach exists. The dial up connection was replaced by a secure frame relay connection or intranet among participating agencies. These agencies house and compile all data on their local machines while using an FTP connection to upload and download data from a server located in the Baltimore City Police Department. This central server is merely an inexpensive exchange point of standardized data among all of the jurisdictions. After the exchanges are made, all of the data belongs fully and completely to each agency to use as they please. Meanwhile, the analysts from each of these agencies regularly communicate with each other to resolve problems or provide further insight and analysis.

The data structure will soon be standardized into a Global Justice Extensible Markup Language (XML) Data Model (Global JXDM)¹ format consistent with federal

guidelines. This will allow participants to share data with agencies outside of their immediate group, and national data searches will be possible. In effect, any jurisdiction should become more willing to support this data structure since it has multiple uses beyond RCAGIS.

While sharing data is paramount throughout a multijurisdictional region, the data would be useless if they could not be displayed and analyzed. RCAGIS is a simple yet powerful tool that brings shared data to the desktops of all those who can use such data in their day-to-day duties.

Universal Appeal of RCAGIS

RCAGIS is a customized mapping component used in Baltimore and surrounding counties that makes flat regional data come to life not only for analysts but for investigators, managers, and police officers as well. Because it is easy to use, operational personnel do not have to depend on static reports from analysts to receive the answers to their questions. RCAGIS is a highly interactive tool that is scalable from the creation of simple crime maps by patrol officers in

¹ Global JXDM was developed by the U.S. Department of Justice's Office of Justice Programs in order to reduce the burden that individual criminal justice agencies typically face in developing common systems in order to share data. For more information on how to obtain and employ Global JXDM, see http://www.it.ojp.gov/topic.jsp?topic_id=43.

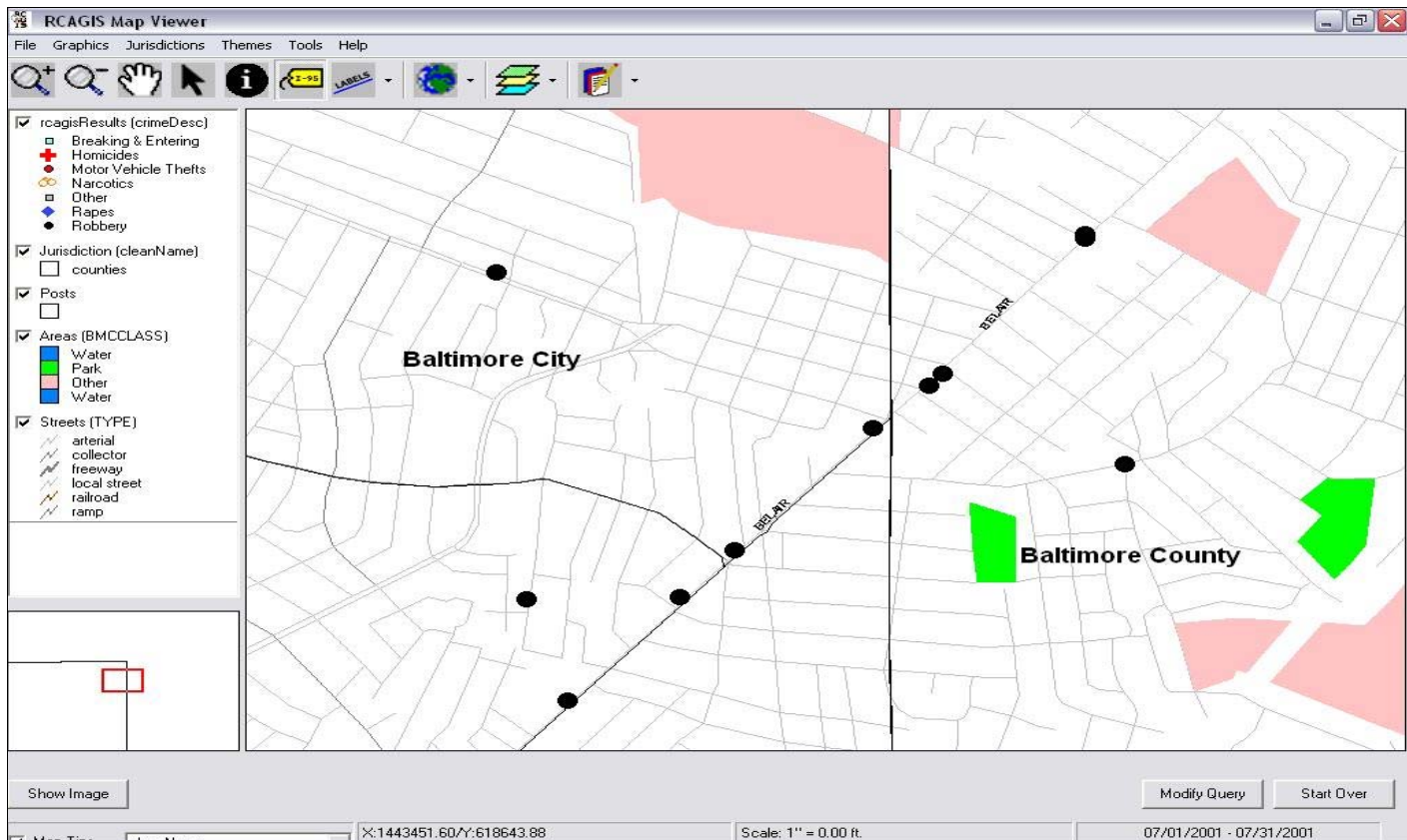


Figure 2. RCAGIS Map Viewer displaying a series of related robberies occurring on Belair Road crossing the jurisdictional boundary between Baltimore City and Baltimore County.

their cars, to mid-level queries employed by investigators at their desks, to high level, statistical analyses performed by crime analysts.

It allows agency personnel to identify criminal activity according to its geographical, temporal, and modus operandi characteristics and to link suspects with identified trends (see Figure 1). So far, the program has been particularly effective in giving officers the opportunity to check on the details of crime and arrests directly across neighboring borders in order to establish linkages to incidents within their own area of responsibility (see Figure 2).

Although the tools within RCAGIS were designed to analyze clusters of crime incidents and quickly pinpoint patterns for the tactical deployment of officers, the primary focus of the system is to identify the people committing the crimes in order to alert the surrounding jurisdictions of their presence. Often, it is another jurisdiction's criminals rather than crime that most concerns officers and analysts. Future versions of the application will include links from a known offender module to mug shot photos. These photos, or any other images, will be geographically referenced, as they will be "hot linked" to points on the map.

Finally, one of the most appealing aspects of the RCAGIS application is that it is open source software. The application is available to any jurisdiction that wants it or any group of agencies that may want to start their own regional data sharing initiative.

After all, the criminals are not inhibited by jurisdictional boundaries, so why should the police be?

About RCAGIS

RCAGIS is an ESRI Map Object-based application initially developed through the U.S. Department of Justice. The program is open source and free to any law enforcement agency that is interested in using it. Currently, upgrades and enhancements are being added through various sources of funding and support. Further information about RCAGIS can be found at <http://www.icpsr.umich.edu/NACJD/RCAGIS/> and from the writers of this article.

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LOOK OUT FOR NEW PUBLICATIONS FROM
THE POLICE FOUNDATION
CRIME MAPPING AND
PROBLEM ANALYSIS LABORATORY

on

- Intelligence and Crime Analysis
- Using Mapping for Prisoner Reentry Efforts
 - Problem Analysis (Case Studies)

COMING SOON!!!!

Highlights of the NIJ MAPS Crime Mapping Research Conference Pittsburgh, PA

by
**Greg Jones, Research and Crime Mapping Coordinator,
Police Foundation Crime Mapping and Problem Analysis Laboratory**

The Ninth Annual Crime Mapping Research Conference, sponsored by Mapping and Analysis for Public Safety (MAPS) of the National Institute of Justice (NIJ), was held March 28-31 at the Omni William Penn Hotel in downtown Pittsburgh, PA. Over 400 representatives from local, state, and federal law enforcement agencies, correctional agencies, nonprofit organizations, public safety organizations, social service agencies, research institutions, and universities attended the conference. The conference began with opening remarks by NIJ staff. In the keynote address, Dr. Andrew D. Reamer of The Brookings Institution, spoke about innovations in contextual data for crime mapping including an overview of relevant federal, state, and local datasets. In addition, there was an introduction by Ron Wilson, NIJ program manager, on CrimeStat IV and all of its new features. The new version is expected to be available by late 2008.

Conference workshops included presentations that were categorized as general, beginner, intermediate, or advanced, based on their respective topic and content. Concurrent panels included the following:

Journey to Crime	Sex Offenders	Crime Analysis
Geographic Profiling	Spatial Data Analysis	Corrections
Policing	Burglary	Probation and Parole
International Programs	University Programs	Violent Crime
OJJDP Smart System	Community/Strategic	Methodology
Web Mapping	Modeling	Community Safety and Resources

The luncheon keynote speaker was Professor George Rengert of Temple University, who provided an interesting talk on the evolution of mapping and where it is today. He concluded with a memorable photo tribute to Dr. Keith Harries, who was absent from the conference but who has contributed significantly to the field of crime mapping and crime analysis over the past twenty-plus years.

Pre-conference training classes included both one-day and two-day workshops. The one-day workshops included Using Hot Spot Software for Crime Analysis and Accessing and Using Census Data for Crime Analysis. The two-day workshops included Crime Mapping with ArcGIS 9.x, Crime Series Analysis and Spatial Statistics with ArcGIS 9.x.

Andrew Brumwell of the West Midlands Police (UK) was the winner of the best overall map in the 7th Annual Map Competition. Other winners included Paul Schneider, City of Jacksonville (FL), for best analytic map display; Steven Rose, West Midlands Police (UK), for best innovative use of mapping; and Andrew Brumwell, who won a second award for best cartographic design. For further information about the conference and to download specific presentations, go to the NIJ MAPS Web site at <http://www.ojp.usdoj.gov/nij/maps/pittsburgh2007/index.html>.

In an effort to continue to provide our readers with practical and innovative crime-mapping projects, partnerships, and applications, the Police Foundation's Crime Mapping and Problem Analysis Laboratory would like to call upon our readers to provide feedback on topics that you would like to read about in future issues of Crime Mapping News. Our past issues have included the following topics:

MAPPING FOR MAJOR EVENTS

USE OF MAPPING IN COURTS AND CORRECTIONS

MAPPING OUT GANG ACTIVITY

USE OF MAPPING ON UNIVERSITY AND COLLEGE CAMPUSES

USE OF GPS AND GIS IN LAW ENFORCEMENT

MAPPING PRISONER REENTRY

MAPPING DRUG AND CONTRABAND ISSUES

PROJECT SAFE NEIGHBORHOODS

CRIME REDUCTION PARTNERSHIPS

**Please e-mail your suggestions and/or feedback to Greg Jones,
Research and Crime Mapping Coordinator, at
gjones@policefoundation.org**



CRIME MAPPING NEWS SPOTLIGHT **George Mason University Geographic Information Sciences Professional Certificate Program**

This month's Crime Mapping News Spotlight features the successful GIS Certificate program established through the Office of Continuing Professional Education (OCPE) at George Mason University. Developed over seven years ago at the Prince William Campus in Manassas, Virginia, the program currently offers two GIS certificates (see course offerings on page 13):

~ **Geographic Information Systems**

(Concentrations available in *Crime Mapping or Defense & Intel*)

~ **Mapping for Public Safety and Homeland Security**

Both noncredit certificates require the completion of eight courses (six core and two electives). The newest certificate, Mapping for Public Safety and Homeland Security, is ideal for those involved in law enforcement and public safety. With classes such as Human Mapping & Analysis, Mapping of Major Events, and Mapping for Fire & EMS, public safety officials can develop plans and procedures to protect their communities using GIS.

The instructors in the GIS Certificate program are experts in their fields and teach the three day, application oriented classes through a combination of lectures and exercises. The small class size and seminar-style environment provide an excellent opportunity for networking and idea sharing between students. Designed around the adult professional, the certificate program allows for flexibility in scheduling with core classes offered twice a year and electives offered once. In addition to the open enrollment program on campus, George Mason University has also been selected by a number of government contractors and federal agencies to provide specific GIS group training at their facilities. The Prince William Campus is located near Route 66 and the 234 bypass in Manassas (against traffic for those of you coming from Northern Virginia). The state-of-the-art lab is outfitted with individual work stations, including 19" flat-screen monitors for high-quality graphics. With an extensive list of courses to choose from, this program is well recognized in the DC, Maryland, and Virginia area as a leader in GIS training.

For more information about the George Mason University GIS Certificate Program, please visit their Web site, http://ocpe.gmu.edu/certificate_programs/gis.html or contact Program Manager Jeanne Spencer at 703-993-8337 or jspence2@gmu.edu.

Geographic Information Systems Certificate

Core Courses

GIS 100 Introduction to Geographic Information Systems
 GIS 110* Introduction to ArcGIS 9.x
 GIS 200 Components of Geographic Information Systems
 GIS 300 Introduction to Spatial Analysis
 GIS 401 Introduction to Database Issues and Integration
 GIS 600 Advanced Map Design and Cartography

Electives (choose two)

GIS 210 Implementation and Management
 GIS 220 Integration of Remote Sensing and GIS
 GIS 230 Introduction to GPS and Photogrammetry
 GIS 240 Raster Analysis and 3D Modeling
 GIS 250 Spatial Statistics and Geostatistical Analysis
 GIS 310 Transportation Applications of GIS
 GIS 330 Human Mapping and Analysis
 GIS 331 Mapping of Major Events
 GIS 332 GIS and the Community
 GIS 333 Mapping for Corrections
 GIS 334 Mapping for Fire and EMS
 GIS 335 Crime Mapping Case Studies
 GIS 340 Environmental Applications of GIS
 GIS 350 Defense and Intelligence Applications of GIS
 GIS 360 Business Applications of GIS
 GIS 370 Public Health Administration and Analysis
 GIS 610 Geographic Knowledge Systems

**GIS 110 must be taken prior to any course except GIS 100*

Mapping for Public Safety and Homeland Security Certificate

Core Courses

GIS 100 Introduction to Geographic Information Systems
 GIS 110* Introduction to ArcGIS 9.x
 GIS 200 Components of Geographic Information Systems
 GIS 330 Human Mapping and Analysis
 GIS 331 Mapping of Major Events
 GIS 600 Advanced Map Design and Cartography

Electives (choose two)

GIS 332 GIS and the Community
 GIS 333 Mapping for Corrections
 GIS 334 Mapping for Fire and EMS
 GIS 335 Crime Mapping Case Studies
 GIS 370 Public Health Administration and Analysis

**GIS 110 must be taken prior to any course except GIS 100*

Upcoming Conferences and Training

JUNE

Introductory ArcGIS I training in select cities:
Charlotte, NC; Saint Paul, MN; Eugene, OR;
Honolulu, HA; Murfreesboro, TN; Albuquerque,
NM; Vienna, VA; and more
[http://training.esri.com/gateway/index.cfm?
fa=catalog.gateway](http://training.esri.com/gateway/index.cfm?fa=catalog.gateway)

Introductory, Intermediate, & Advanced MapInfo Profes-
sional training in select cities:
Atlanta, GA; Dallas, TX; Denver, CO; Des Plaines,
IL; Orlando, FL; Newport Beach, CA; Toronto;
ON; Ottawa, ON
www.mapinfo.com

Working with ArcGIS Spatial Analyst in select cities:
Redlands, CA; Arlington TX; Chesterbrook, PA;
St. Charles, MO; Albuquerque, NM; Phoenix, AZ;
Duluth, GA; and more
[http://training.esri.com/gateway/index.cfm?
fa=catalog.gateway](http://training.esri.com/gateway/index.cfm?fa=catalog.gateway)

JULY

Introductory ArcGIS I training in select cities:
(see link above)

Working with ArcGIS Spatial Analyst in select cities:
(see link above)

Introductory, Intermediate, & Advanced MapInfo Profes-
sional training in select cities:
Atlanta, GA; Dallas, TX; Denver, CO; Newport
Beach, CA; Toronto, ON; Troy, NY
www.mapinfo.com

AUGUST

Crime Mapping and Analysis Program, Tactical and Opera-
tional Analysis:
August 6 - 10, 2007
NCTC, PA
http://www.crimeanalysts.net/class_schedule.htm

GENERAL WEB RESOURCES FOR TRAINING SEMINARS AND CONFERENCES

<http://giscenter.isu.edu/training/index.htm>
<http://msdisweb.missouri.edu>
www.actnowinc.org
www.alphagroupcenter.com
http://www.cicp.org/course_sched.html
www.cops.usdoj.gov
www.esri.com/events
<http://www.iaca.net/Training.asp>
www.ialeia.org
www.ialep.org
www.mapinfo.com/events
www.nijpcs.org/upcoming.htm
www.nlectc.org/nlectcrm
www.nsgic.org
www.urisa.org/meetings.htm
http://ocpe.gmu.edu/certificate_programs/gis.html
[http://www.worldcampus.psu.edu/wc/
GISCertificate.shtml](http://www.worldcampus.psu.edu/wc/GISCertificate.shtml)

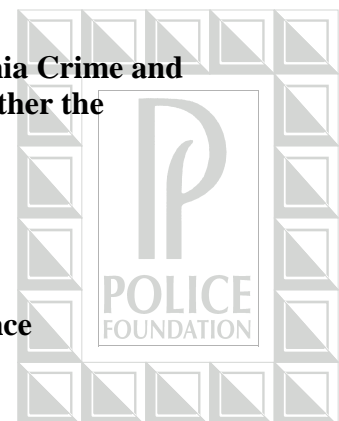
Looking Ahead in 2007!!

**International Association of Crime Analysts & California Crime and
Intelligence Analysts Association are putting together the
upcoming IACA conference**

**September 24 - 27
Pasadena, CA
www.iaca.net**

**International GIS Crime Mapping Conference
September 25 - 26**

**The Radisson SAS Royal Hotel, Brussels
www.iqpc.com/be/giscrime**



The mission of the U.S. Department of Justice, Office of Community Oriented Policing Services (COPS) is to advance community policing in jurisdictions of all sizes across the country.

COPS provides grants to tribal, state, and local law enforcement agencies to hire and train community policing professionals, acquire and deploy cutting-edge crime-fighting technologies, and develop and test innovative policing strategies. COPS also provides a wide range of original publications, tools, and products designed specifically for law enforcement and community members who wish to enhance their community policing capabilities.

This broad range of programs and products helps COPS offer agencies support in virtually every aspect of law enforcement, and it's making America safer, one neighborhood at a time.

Visit www.cops.usdoj.gov to:

Obtain information on COPS funding opportunities

Read up on the most relevant issues in community policing today

Learn about training opportunities

Visit our resource room online or call the U.S. Department of Justice Response Center at **800.421.6770** for a full selection of COPS publications and other resources.

www.cops.usdoj.gov

ABOUT THE POLICE FOUNDATION

The Police Foundation is a national, nonpartisan, not-for-profit organization dedicated to supporting innovation and improvement in policing through its research, technical assistance, communication, and professional services programs. Established in 1970, the foundation has conducted seminal research in police behavior, policy, and procedure, and works to transfer to local agencies the best new information about practices for dealing effectively with a range of important police operational and administrative concerns. Motivating all of the foundation's efforts is the goal of efficient, humane policing that operates within the framework of democratic principles and the highest ideals of the nation.

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