Crime Mapping News

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The topic of this issue of *Crime Mapping News* is the use of mapping tools and applications to assist crime analysts in their daily crime mapping efforts. This issue begins with an article about a text analysis tool by the Jacksonville (FL) Sheriff's Office to help identify emerging crime patterns and investigate long term crime problems. The second article describes advanced mapping techniques and concepts that can be applied using tactical crime analysis software. The third article discusses the 2008 International Association of Crime Analysts conference. The final article is part of our *Crime Mapping News Spotlight* series in which we highlight the growth or advancement of a particular crime analysis unit, or the development of a specific program or event that incorporates key areas of this overall publication and relates to the field. This issue's spotlight is on the crime analysis unit at the Port St. Lucie (FL) Police Department.

Jacksonville Sheriff's Office: Mapping with Text Analysis

by Matthew White, Analysis Head, and Todd Wiles, Crime Analyst II

The ability to map criminal incident data has become an integral part of most modern police departments. At the Jacksonville Sheriff's Office (JSO) crime mapping is the focal point of all analysts' daily work flow. The Crime Analysis Unit (CAU) has developed a daily standard process that cleans, classifies, and merges data from multiple tables in the agency's Records Management System (RMS). This information is then geocoded and pushed out to a base map containing a variety of geographic data layers. This allows analysts to use geo-spatial and temporal techniques to identify fast-emerging patterns of crime as well as conduct strategic analyses on long term crime problems. Specifically, this is accomplished by enabling analysts to scan, review, or otherwise analyze criminal incidents, field interviews, arrests and much more by map-enabling virtually all JSO data. Even multiple addresses in datasets are mapped separately, such as arrest locations versus arrest incident locations versus arrestee's home address. This mapped data is linked to a browser-based Web site which allows analysts to navigate to associated data in the agency's data warehouse and beyond.

The JSO's analysis model is ultimately designed to promote flexible and timely tactical and strategic intelligence and analysis. This model has greatly increased the efficiency of analysts in providing meaningful information to officers, detectives, and command staff; however, analysts still run into the common pitfalls of reviewing and interpreting vast amounts of information. The JSO serves a population of over a million people and collects an average of 320 criminal incident reports per day. The large volume of information coming into the system creates challenges in reviewing reports in a timely manner and also in keeping track of related information over time. Analysts can often feel like they are reading the same report over and over again as the details tend to blur together. Analysis tools designed for data manipulation and reporting have greatly lessened the burden of reading incident data; however, they are not without limitations. One common issue encountered when querying tabular data is the lack of detail and flexibility analysts have in relying on standardized data fields. Although standardizing

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data value choices with drop-down selections and check boxes greatly strengthens the ability to query and manipulate data, as well as limits detail. Even the most elaborate RMS can not represent and categorize every circumstance of a criminal incident. On the other hand, narratives, case notes, and other such unstructured data do not naturally lend themsleves to the most relied upon analysis tools.

The JSO CAU repeatedly found that while spatial and temporal methods offer the ability to quickly establish commonality across tabular data they leave the valuable qualitative information contained in the police narrative out of the equation. As a result, analysts still spent a good portion of their day reading through reports, field interviews, and other free-text formatted information to find patterns of crime.

These issues led, the JSO CAU to look for a better way to mine, and ultimately map, information from police narratives. Free-text internet search offered by a variety of Web applications is a crucial part of any efficient analyst's toolbox. The ability to filter through billions of pages of information using a simple line of search terms has revolutionized the way we all access knowledge on the Web. Jacksonville has deployed uReveal, a software program that allows analysts to utilize free-text search technology on police incident reports in a way that is all inclusive (finding information in structured or unstructured fields). By building and storing concepts with this tool, analysts have greater flexibility in finding what they really want in the data.

It is important to understand that concept banking refers to customized searches that are saved and stored in the program. These searches can be thought of as ideas in the form of a free-text query. For example, the idea of removing a serial number from a firearm may be written as a concept by creating syntax to search for the words "scratched" or "removed" and the words "firearm" or "handgun" or "rifle" in the same incident report. Individual concepts can then be combined with each other to make complex concepts. This concept for removing serial numbers could be combined with a concept for gangs, forming a more complex concept that would find any report referencing a gun with a removed serial number that related to gangs.

The ability to leverage such concepts has proven very useful for crime pattern analysis, among other things. These queries run automatically on new police reports after they enter the system. This has allowed the JSO to utilize free-text analysis to perform repetitive functions like collecting and organizing reports with similar circumstances. Although this function could be automated through structured data queries, unstructured text analysis offers a more precise and accurate way to distinguish commonality in paragraphs of information such as the description of suspects, description of vehicles, or the description of modus operandi (MO). Part of this pattern-analysis capability is that concepts can be leveraged via the agency's geographic information system (GIS) technology. GIS enables analysts to see where and when crimes are occurring. uReveal offers a more robust way to collate those crimes and identify patterns. For example, a concept can be used to query burglaries where a suspect attempts a similar method of entry or targets the same kinds of property. Since a variable like type of property stolen can be described and spelled in a true myriad of ways, and/or in a myriad of locations in police reports, analysts are often missing much of what they need by relying on structured fields in their data. In this example, cases that might not even be classified as burglary but rather as theft, auto burglaries, information reports, or even domestic violence could have relevant ties based on the described method of entry and property.

To illustrate this, we'll first consider burglary and theft from construction sites. This problem raged in 2006 and 2007 and remains a major problem in the Jacksonville area and many parts of the country despite the housing slump. Estimates indicate that between $1 billion and $4 billion worth of materials, tools, and equipment are stolen every year in the United States. Some contributing causes to the problem include the ease of access to construction sites and the rising costs of building materials. In addition, the ability to recoup losses through insurance claims makes contractors slow to spend money to properly secure sites or hire security (Boba & Santos 2006). JSO analysts use a construction burglary concept to track this crime problem that often turns into a crime pattern. When comparing a traditional query (in this case SQL) used to monitor construction burglary with a concept (an unstructured text query in uReveal) (see Figure 1) it was discovered that the concept search returned over three times as many incidents for the same time period (see Figure 2).

The JSO has also used concept mapping for Crime Prevention Through Environment Design (CPTED) projects. An example of a CPTED related concept is essentially a list of adjectives describing poor lighting, for example: "dim" or "dark" or "poor" or "bad" within two words of "light" or "visibility." The results of this concept search would return incidents where the reporting officer makes reference to poor lighting as in the following narrative: "The witness stated that she was upstairs on the second-story patio at the time of the incident and due to poor lighting was unable to see the suspects' faces." Poor lighting at a particular apartment complex may be common knowledge among officers that work in a beat but may not be apparent to analysts as it is only listed in the narrative section of the report. The ability to quickly find these details has proven beneficial in researching for crime control initiatives.

An example of this type of use was a project in early 2007 when the City of Jacksonville conducted a revitalization program called Seeds of Change in the northwest part of the city. Through this initiative several geographic areas were designated as in need of change due to disproportionately high-crime rates. Crime analysts involved in the project recognized there was an abundance of vacant homes in the Seeds of Change area. Studies in environmental criminology have shown vacant and abandoned homes in urban areas pose an excellent haven for illegal activity. Some examples include

SQL query searching the variables incident location type and offense type:

([LocationType] = 'CONSTRUCTION SITE' AND ([Offense] like '*burglary*' or [Offense] like '*theft*' or [Offense] like '*larceny*'))

Free-text query on the entire police incident report:

((construction w/5 (site or area or zone or ground or home or house or location)) and (burglary or burglaries or theft or larceny))

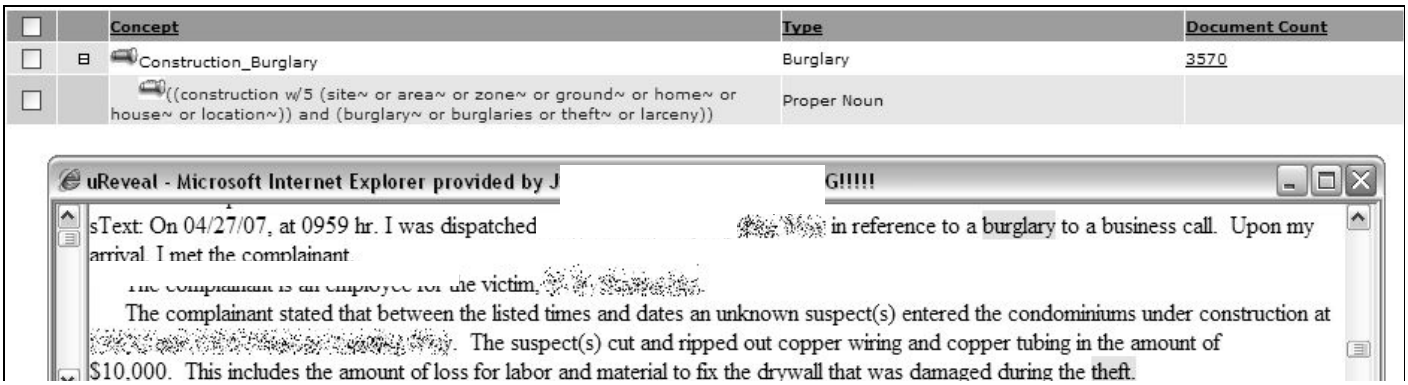

Figure 1. Free-text concept designed to capture construction site burglaries or thefts followed by a police narrative referencing a construction site burglary

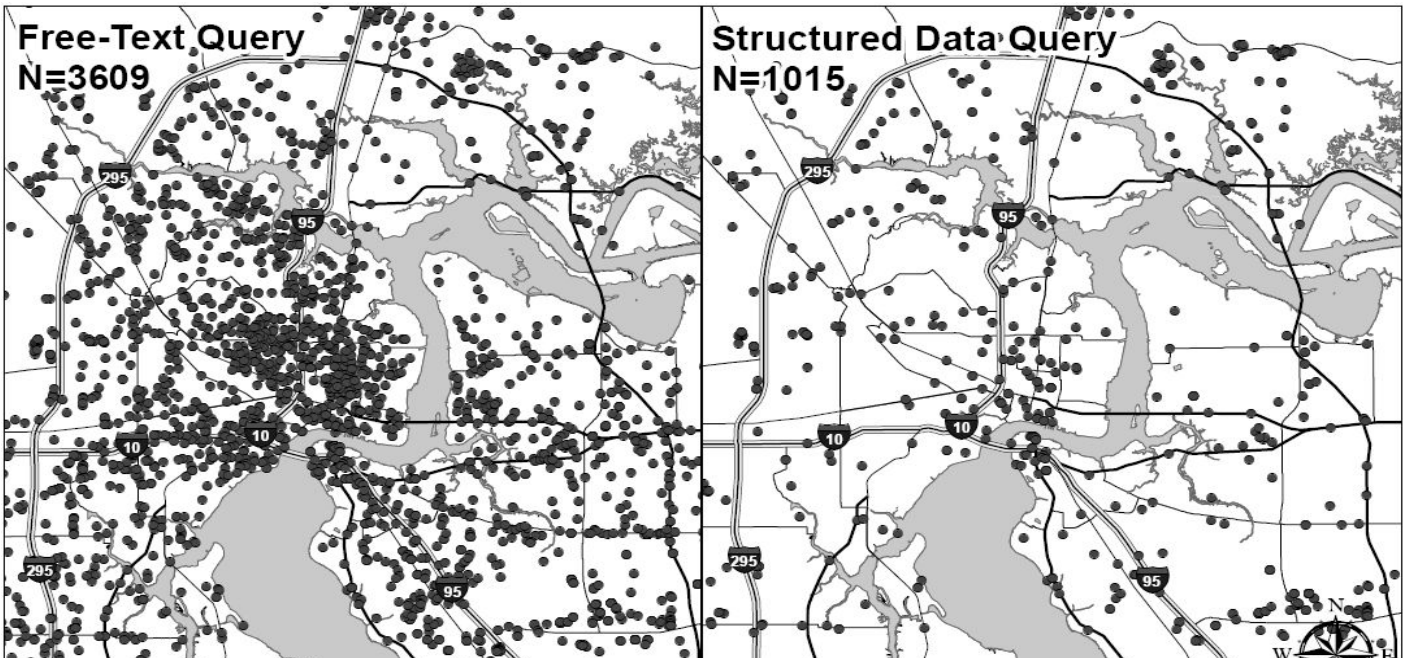

Figure 2. Incidents involving theft or burglary from a construction site in Jacksonville between 1/1/2007 and 11/22/2008. The graphic on the left shows incidents retrieved by a free-text query; the graphic on the right shows incidents retrieved by a structured data query using SQL.

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. In addition, only light editing has been done in order to keep each author's voice and tone.*

vacant houses being used as hangouts by truant juveniles and local street gangs. In addition, abandoned homes are often used for drug consumption, drug sales, and prostitution. Even worse, vacant houses have been used in sexual assault incidents where victims are abducted while passing through the area. While the public safety issue surrounding abandoned homes may be a known problem, revitalization recommendations often slip through the cracks in the absence of documented evidence and sound anlaysis.

Realizing this, JSO analysts created a concept for abandoned structures that helped identify homes frequently used in criminal incidents. These incidents were then mapped and geographically selected from the Seeds of Change areas. While many hundreds of vacant homes existed in the targeted area, the result of the analysis documented only 54 of these homes as being used for criminal activity. The analysis was then compiled into a report and sent to the city with details about the crimes committed at specific addresses. CAU proposed the city should prioritize the houses responsible for contributing to the most serious crimes when deciding how to use resources to address abandoned structures. These homes can only be found by tying actual crime reports to such locations. The report found: "In this area there have been 54 abandoned or vacant properties that have been identified as having at least one criminal incident in the time period of January 1, 2006, to February 12, 2007. Of these 54 identified properties, at least 15 have been the dump site for stolen vehicles. The majority of the offenses that occur in or around abandoned/ vacant properties are less serious offenses such as vandalism and trespassing. However, in some cases these houses are associated with much more serious offenses such as homicide, battery, and rape." (see Figure 3.)

The ability to map incidents related to criminal networks through the use of concepts is another technique the JSO has utilized. Analysts have created concepts used to research incidents involving gang activity and police contact with individuals who have met the statutory requirement to be classified as gang members. Several of the concepts used to analyze this crime problem are lists of graffiti associated with the gangs, tattoos or symbols associated with the gangs, lists of the individuals in specific gangs, and variations of the gangs' names. These incidents can then be mapped to identify areas of gang activity. Analysts have found several benefits to researching gangs with concepts; first, these types of searches typically retrieve far more gang-related reports than traditional queries. Second, although it was previously possible to map gang member locations, street addresses needed to be manually updated. These addresses were commonly tied to basic self-reported home address information, which was often problematic due to inaccuracy in arrestee self reporting. However, concepts are always running and updating as the system is populated with police reports. These searches ensnare any report making reference

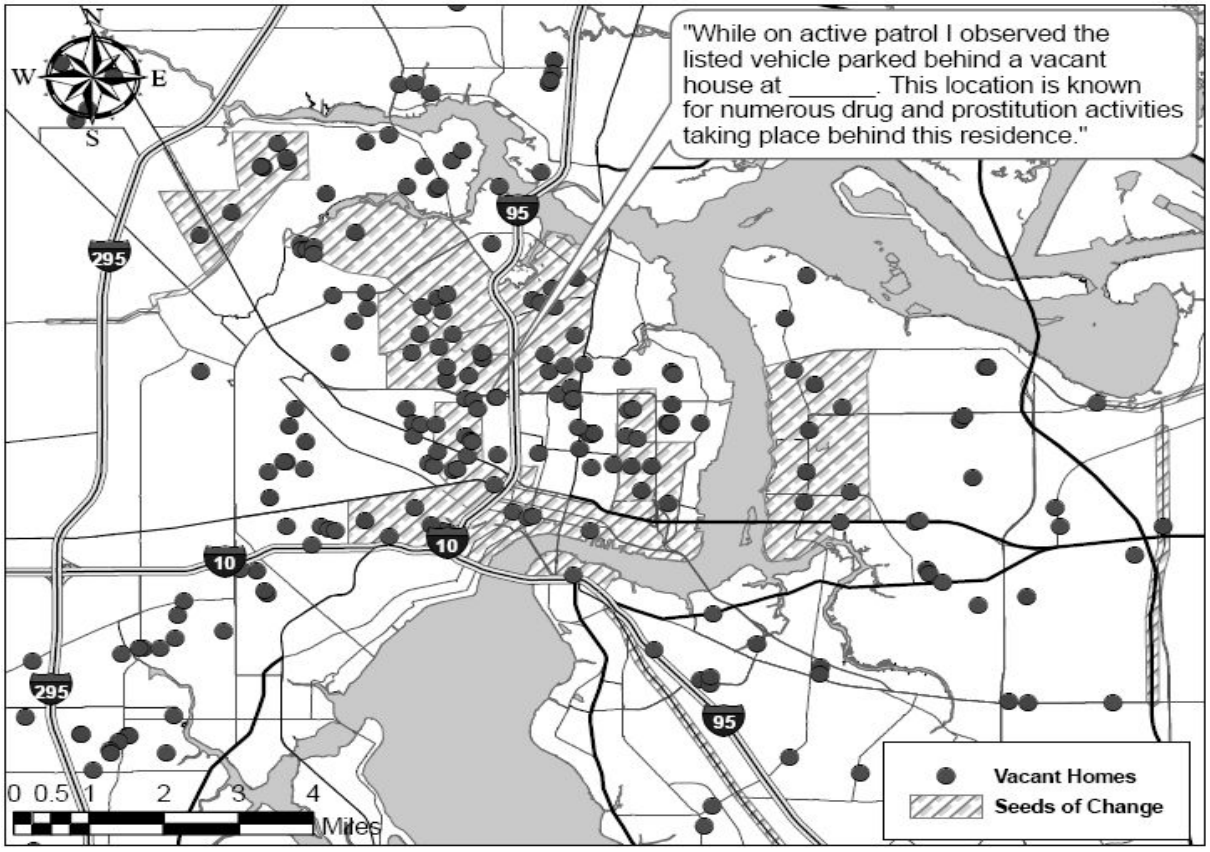

Figure 3. Dots indicate criminal incidents involving a vacant or abandoned structure. Hatched boundary indicates designated Seeds of Change areas in the Jacksonville area.

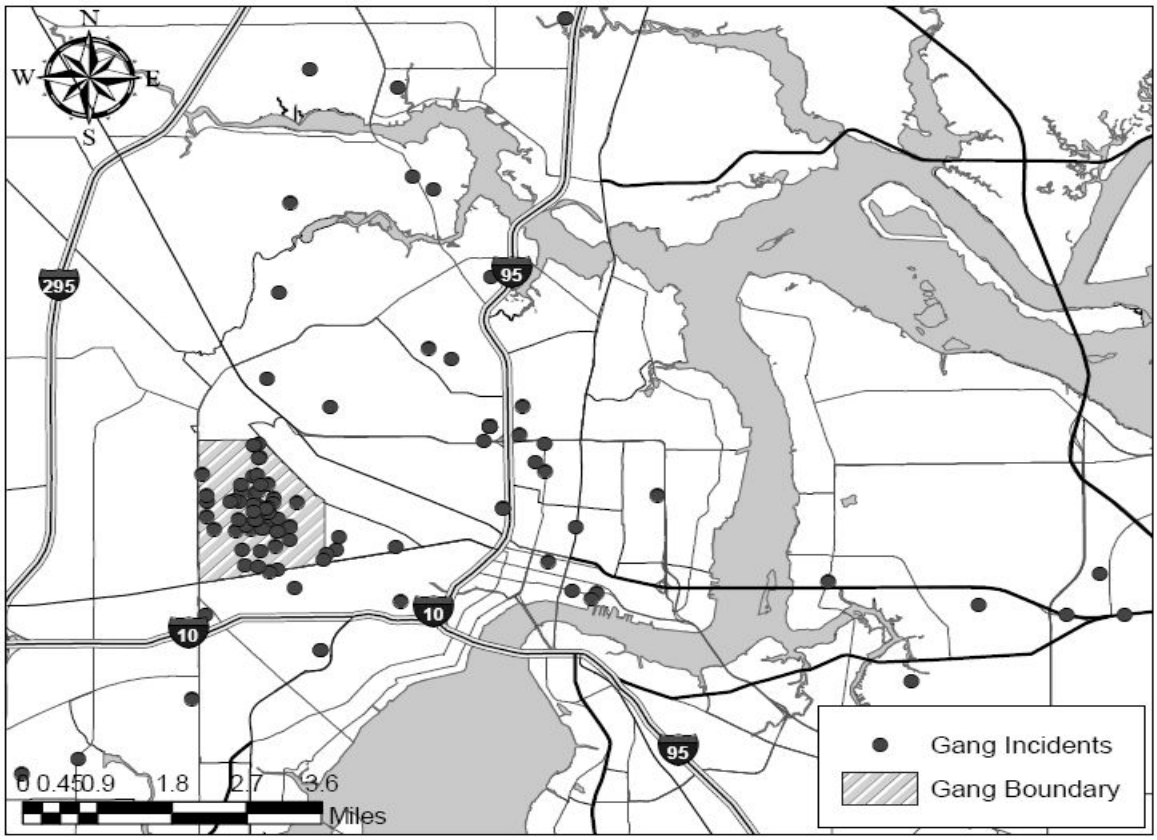

Figure 4. Dots represent incidents involving a local Jacksonville gang, the individual gang members, or their known hangouts. Hatched boundary represents the gang's known territory.

to such gang information, even if the officer involved had no idea of the incidents being related to a particular gang.

As an example, Figure 4 references activity relating to a local gang in Jacksonville known as Buck Block. Unfortunately, the spelling and variance on this gang name can be dramatically different (there are at least 14 different known ways it has been spelled or abbreviated in reports). A traditional view of gang activity might search based on a gang dropdown chosen by a reporting officer, or by known members' home addresses. Concept-based mapping eliminates those issues by mapping all incidents where the gang (no matter the field or the spelling), the members (by name or nickname), and other attributes (associated tattoos or graffiti) are referenced in a report. The result is a far more realistic and holistic view of the gang-related incidents and thus their true activity and territory.

This article was designed to highlight some of the mapping advantages the JSO has experienced through the incorporation of unstructured text analysis. The JSO analysis unit is committed to extending what police data can do by providing insight and intelligence to help the agency's performance across units and responsibilities. The JSO has used uReveal to synthesize knowledge by working beyond the structured fields to include the vast amount of unstructured information contained in police reports. The progression allows analysts to marry next generation text analysis to existing ESRI mapping technology. The result is a dramatically extended capability to map what matters. This allows analysts a more robust way to leverage data and deliver analytical products and insight that make a difference.

References:

Boba, R. & Santos, R. (2006). *Burglary at Single-Family House Construction Sites. Guide No. 43* Retrieved November 11, 2008, from http://www.popcenter.org/problems/construction_burglary/

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New Trends in Advanced Crime and Intelligence Analysis: Understanding the Utility and Capabilities of ATAC in Law Enforcement

by
Sean Bair, President, Bair Software Inc.

Introduction

While some departments across the country are just getting into crime analysis or have hired their first crime analyst, other departments have begun to incorporate more advanced analytic techniques into their repertoire. Of course, the term "advanced" is relative. Techniques and functions that might constitute advanced analysis in law enforcement are industry standard techniques in other disciplines and vice versa. Techniques, such as Lag Variogram, an analytical method to study changes in timing, are considered advanced and, although seldom used by law enforcement, have been in existence and used by other disciplines for decades. Regression, another technique, was invented in 1888 but has only recently become commonplace in law enforcement, thanks in part to easier to use applications, such as Microsoft Excel. This article introduces techniques and concepts that have been labeled "advanced" or are less common in law enforcement and demonstrates how they have become easier to use and more financially attainable through programs like Automated Tactical Analysis of Crime (ATAC) (see Figure 1).

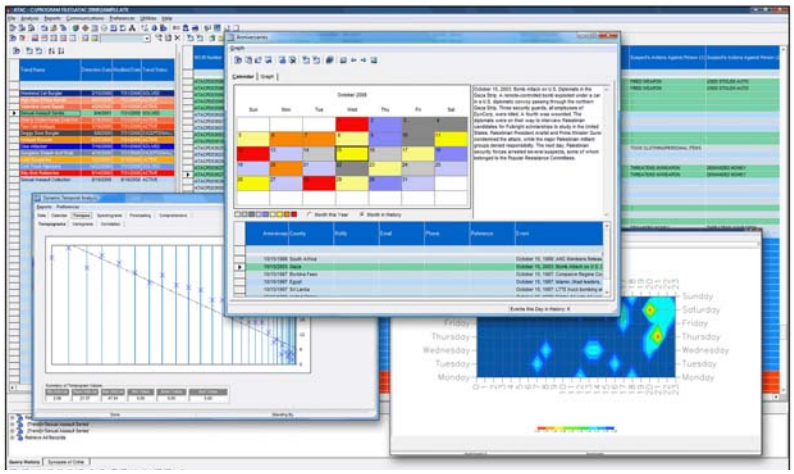

Figure 1. Screenshots of various ATAC utilities

Regression and Correlation

Regression examines the relationship of a dependent variable (response variable) to specified independent variables (predictors). It takes a mathematical look at two numeric variables to see if one is dependent upon another. An example would be if the number of police reports written by an officer was *dependent* upon the number of calls for service to which he or she responds (*independent*).

Many crime analysts were introduced to regression through a required undergraduate statistics course. It can often be tricky and tedious to set up regression using anything other than a high-end statistical application. Moreover, the interpretation of the results can also be a bit daunting. ATAC takes into consideration these difficulties and makes using regression easy.

Regression in law enforcement has many applications. One example is measuring the correlation between the amount of time that has elapsed between events in a crime series and the amount of money the offender acquired in each crime. Does the amount of money taken in a bank robbery determine when the robber will hit again? If there is a positive correlation, the results can assist the analyst in predicting when the offender might strike again.

Fortunately, the software applications used to perform regression have become more prevalent and easier to use. The ATAC software clearly defines which variables need to be considered and allows the analyst to solve for the prediction. If Officer Smith goes on thirty calls tonight, the analyst can determine how many reports he *should* write, given the correlation already measured through past call-for-service to report activity. Using ATAC to quickly calculate a regression is very useful for addressing both internal and external law enforcement issues (see Figure 2).

Static vs. Dynamic

Analysts are beginning to use more advanced techniques to analyze movement. Traditionally, analysts studied crime series as if they occurred all at the same time, or statically. That is, they studied all of the crimes simultaneously, both temporally and spatially. When presented with a crime series, analysts would geocode the crimes onto a map and then analyze them. They would study their density, look for repeating addresses, and possible Choropleth areas to determine possible areas to deploy officers. Likewise, they would analyze the temporal pattern of the crimes to determine which day or hour the criminal would likely chose to offend. Throughout the process, the target of study was the crime series and all of the crimes as a whole.

Studying the crime series statically is important but doesn't consider the interaction between events. More advanced techniques incorporate dynamic analysis, or the study of change. In a crime series, dynamic analysis attempts to determine what motivates the offender from one event to the next, in an effort to uncover some corollary or purpose for changes. Using dynamic techniques enables analysts to determine changes in bearing, distance, direction, tempo, and motivating factors, such as money. Often these techniques are no harder to apply than those in static analysis.

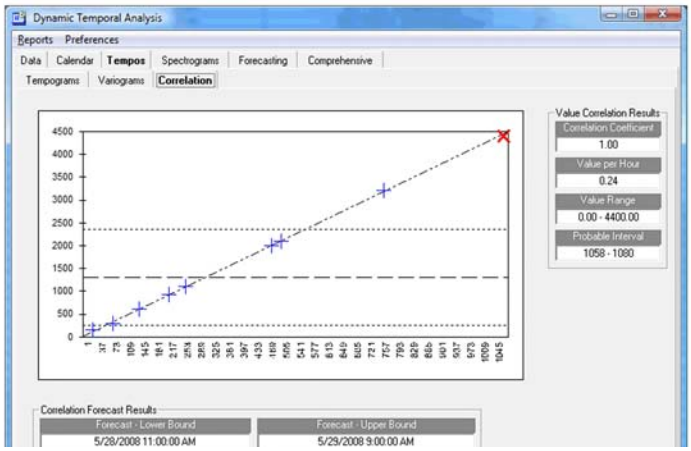

Figure 2. ATAC correlation

Dynamic analysis is more comprehensive and allows for any hidden patterns within the series to emerge. The offender might hit on weekends in one geographic region and weekdays in another. It is imperative that analysts have the ability to pass data quickly between spatial and temporal viewpoints.

ATAC integrates spatial and temporal functions and gives the analyst many options for breaking down data. The analyst can choose to query, map, and break down data by day of week and hour of day. Or the analyst can break down data temporally, then query for similarities, all before mapping the data. This ability to easily pass data back and forth is essential to finding the underlying clues to offender activity (see Figure 3).

Geographic Information Systems (GIS)

With the advent of computers and computerized mapping, a new world has opened up for identifying relationships between data. Using GIS, analysts can now measure the relationship between various layers of information. Analysts are using GIS to create and perform modeling of movements.

Crime analysis has come a long way from the days when analysts pushed pins in maps mounted on a briefing room wall. The introduction of GIS into law enforcement has arguably offered the biggest technological advancement in crime analysis. Advanced forms of analysis have emerged that enable analysts to visualize complex temporal and spatial interactions between events. Techniques, such as Lund-space-time trajectories enable an analyst to geocode not only the events in two dimensions on the surface of the earth, but also to geocode to a third dimension—time.

Using a calculated temporal coordinate (t-coordinate), analysts can extrapolate a point's vertical position above the surface of the earth based on when the event occurred in time. As a result, not only is the point mapped in terms of its physical location but it is also mapped to show temporal aspects of the series. Those events that occurred first find their place closest to the earth. The vertical distance from one point to another point provides a visual representation of how far apart the events were in time. A Lund space-time trajectory then connects the points chronologically to display a movement path in space and time.

Other forms of advanced analysis include the ever-popular density analysis, which is likely the single most significant technique in crime analysis. This technique has been in use in most every other profession since the dawn of GIS. However, within the last decade the use of density analysis in crime analysis has become more popular. Density analysis maps are commonly used to identify "hot spots." They are often called "hot spot" maps because of the way they look when complete: they show areas of elevated activity through their use of vivid color ramps.

Density mapping is considered a more advanced technique because it can be difficult to produce and the results are complex to interpret. Not one of the over three thousand people to whom I have taught crime analysis worldwide was able to accurately and coherently explain the results provided by a density analysis (including this author). Default settings and arbitrary distances only compound accuracy problems, and proper distance calculations should be performed before using the density tool.

Density analysis can also be used to perform geographic profiling, which attempts to determine likely anchor points of an offender based on locations where he has chosen to strike. By simply modifying search distances in the density analysis function to a meaningful distance derived from analysis of the events in a series, the analyst can begin to use density analysis to determine likely anchor points. By appropriately changing the distance settings of the tool, results can lead the analyst from identifying hot spots to uncovering the likely location of offender anchor points.

ATAC automatically calculates a statistically significant search distance necessary for identifying clusters in data. ATAC's built in mapping module allows the analyst to avoid potential pitfalls of incorrect calculations and frees up time for actual analysis (see Figure 4).

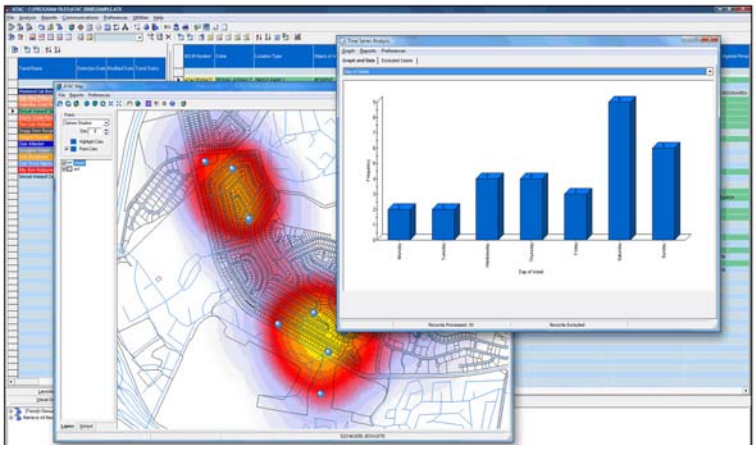

Figure 3. ATAC map and temporal analysis

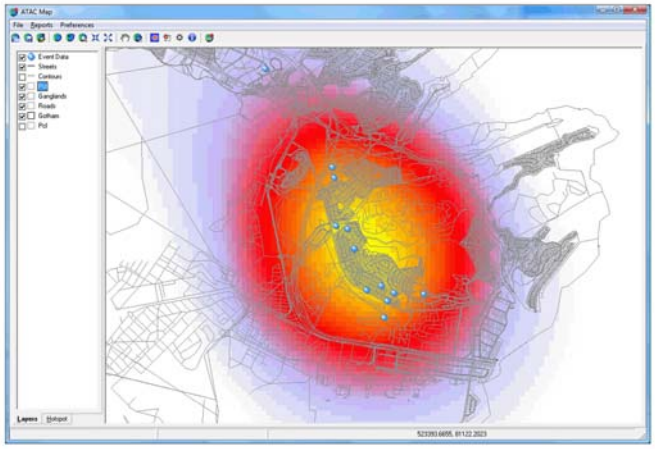

Figure 4. ATAC map

Data Mining

From data comes information; from information comes knowledge. With the knowledge from data, we have a better understanding and are able to make more effective and informed decisions regarding police operations.

In addition to having proficiency in statistics, temporal analysis, and spatial analysis, crime analysts should also be skilled at databases and the means used to mine their data. While analysts are becoming more proficient using data and databases, they rarely have mastery of the language used to query the data. As a result, data mining remains the area that has the largest room for growth in crime analysis today.

Structured Query Language (SQL) is the most common and basic language used to mine data. Analysts are beginning to understand more of SQL's power, and need to master it as the means to extract information from their often complex and confusing databases. Using SQL, analysts can query the database for information, perform statistical analysis, and even modify their data to better meet their needs.

The visual queries that can be built in ATAC guide an analyst through creating proper SQL statements to retrieve data. These queries can then be saved and opened again at a later date to avoid duplicating common queries (see Figure 5).

Beyond SQL, further technological advancements now offer crime analysts yet another progression—Regular Expressions (RegEx). RegEx is a very powerful language that can be used to extract meaningful information from data and provides an ability to query for data in ways not possible using traditional SQL.

RegEx is capable of performing proximity queries, such as find the word "green" within five words of "motorcycle." Proximity searches are particularly useful in law enforcement as a means to identify important descriptors and relationships between variables. The financial industry has been using RegEx for years to uncover complex patterns and relationships in financial data. When you receive catalogs or unsolicited items in the mail, it is most likely due to some pattern in your spending habits uncovered using RegEx.

The challenge of utilizing RegEx lies in its complexity. Whereas SQL is a structured language used against any data structure, RegEx must be written in specialized application and can be much more confusing than SQL, requiring a completely new set of rules to learn to perform even the simplest of queries.

To make this revolutionary query language available to crime analysts, ATAC provides a module dedicated to simplifying the use of RegEx. ATAC has an interface that allows easy and understandable language to be translated to RegEx for the sake of querying data. For example, to query for all crimes where "copper" was found within five words of "pipe," the analyst would simply type "copper within five words of pipe." ATAC translates this literal expression to its actual RegEx (see Figure 6):

```
\b(?:COPPER\W+(?:\w+\W+){0,5}PIPE|PIPE
\W+(?:\w+\W+){0,5}COPPER\b)
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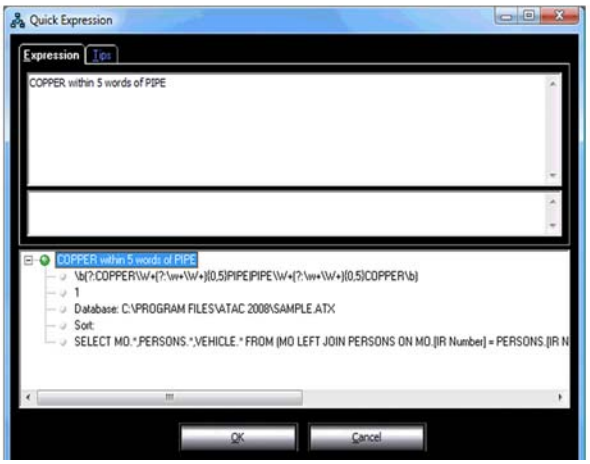

Figure 6. ATAC quick expressions

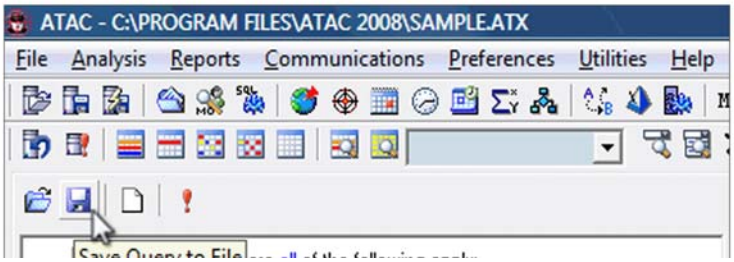

Figure 5. ATAC visual query

Concepts

Advancements in the way we query for information have brought us from SQL to RegEx and even a step further into Concepts. Concepts apply regular expressions in an entirely new and interesting way. Multiple, regular expressions are combined into a larger concept. Once the concept is developed, the analyst can then combine multiple concepts to uncover most anything imaginable. Borrowing from an earlier example, a concept might be used to find

where a "green motorcycle" was used in a crime. The analyst first develops a concept for the color green. The "green" concept may look for synonyms of green, such as turquoise, teal, and even bluish. The concept of a motorcycle may include motorcycle, moped, chopper, etc. Once both concepts are developed, the analyst simply tells the program to conduct a search using these concepts together. In this case, the analyst might instruct the software program to search for the "green" concept within twenty words of the "motorcycle" concept.

More complex and advanced concepts can be developed with a mastery of RegEx. For example, the military might want to identify references to "tanks" in data. A concept developed that looks for tanks might instruct the program to look for the word "tank" but it cannot occur with a certain number of words, such as fish, gas, or propane. This concept reduces the possibility of false positives while looking for tanks and improves an analyst's efficiency and effectiveness.

ATAC creates, saves, and stores these concepts for future use and they can be emailed to other ATAC users to share. Entire libraries of search mechanisms can be built and shared. Concepts have great potential for law enforcement and their use is beginning to emerge in a handful of departments around the world.

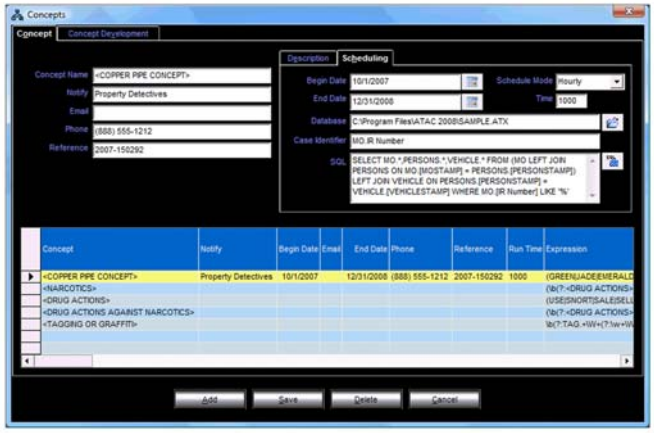

Figure 7. ATAC concepts

Methods

Tactical crime analysis has greatly improved both technologically and methodologically. One of the most progressive methods recently introduced is the IZE method for finding crime series in tabular data, so named because every step ends with the three characters, "ize."

Traditional methods for identifying crime series include reading police reports and playing a mental mahjong game of finding matching cases. Now analysts have a standardized methodology that can enable them to identify more crime series than before. The IZE method instructs an analyst to categorize, generalize, organize, minimize, and maximize their data in such a way that patterns begin to emerge. The general steps are outlined below:

- **Categorize**–Create variables conducive to finding crime trends (hair, race, sex, point of entry, weapon type, vehicle make, etc.).
- **Generalize**–Create general values for categories (handgun, rifle, male, female, brown, black, blonde, etc.).
- **Organize**–Group certain MO variables and person categories together; sort data.
- **Minimize**–Query for clusters in your data identified by organizing it.
- **Maximize**–Query features salient to the identified crime series.

ATAC's functions are geared toward using these processes to most effectively and efficiently find crime patterns and series using the multifaceted approach of data mining, GIS, statistics, and temporal analysis.

Techniques and tools that were once considered advanced or unattainable without sophisticated and expensive software have recently become easier to use and more affordable. Whether a department is just beginning its first crime analysis effort or a seasoned shop is expanding its current capabilities, ATAC is a tool that can help by providing analysts with temporal, statistical, spatial, and data mining capabilities in one easy to use application.

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Highlights of the 2008 International Association of Crime Analysts Conference

by
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The Eighteenth Annual International Association of Crime Analysts Conference, hosted jointly with the Florida Crime and Intelligence Analysts Association, Inc. (FCIAA), was held October 13 - 16 in St. Pete Beach, Florida. Approximately 300 representatives from local, state, and federal law enforcement agencies, correctional agencies, nonprofit organizations, public safety organizations, research institutions, and universities attended the conference. In addition to Canada, some of this year's international attendees included representatives from Australia, Chile, Trinidad & Tobago, Brazil, and Kenya. The conference began with opening remarks by IACA President, Chris Bruce and a welcome address by the President of FCIAA, Edward Smith. In the keynote address, Michael Scott, Director of the Problem Oriented Policing (POP) Center, spoke about enhancing the analyst's role in policing and the role that other agencies must play in conjunction with law enforcement to help reduce crime and disorder problems. The concurrent tracks at the conference included the following:

- Crime Analysis/Educational
- Tactical
- Intelligence
- Computer Lab 1
- Computer Lab 2
- Roundtable Discussion

Examples of presentations from each track, respectively, included:

- Developing a Strategic Plane for Your CAU, Problem Solving and Compstat: Can They Coexist
- What Every Analyst Needs to Know About Strategies & Tactics, Using GIS in Crime Analysis
- Graffiti Net: Sharing Information, Real Time Intelligence-Led Policing: The Circle of Success
- E-mail Tracing, Advanced Analytical Techniques Using Microsoft Excel
- Adobe Photoshop I & II, Beat Redistricting Using ArcGIS 9.2
- How to Better Market Ourselves to Police Agencies and Government Officials

The luncheon keynote speaker was Chief Tom Casady of the Lincoln (NE) Police Department. He provided a critique of various crime analysis products used in the field and suggested ways to make some of them more actionable and meaningful for decision makers. During the conference, participants were able to visit the exhibition room where nineteen vendors, including sponsors, shared and demonstrated the utility of their products. In addition, the IACA President's Award was presented to Martha Sepulveda Scarpa of the Fundacian Paz Cuidadana in Chile and the IACA Board Award was given to Matt White of the Jacksonville Sheriff's Office. Several other awards were presented including the award for best bulletin and analytical products (i.e., mapping, tactical, intelligence, and statistical). More information about these awards and other presentations, which are also available for download, can be found on the IACA Web site in the members-only area.

The next IACA conference is going to held October 12 - 15, 2009, in Scottsdale, AZ. Further information about conference registration and hotel accommodations can be found at http://www.iaca.net.

The Police Foundation has released a comprehensive new report, *The Role of Local Police: Striking a Balance Between Immigration Enforcement and Civil Liberties*. The report is available at www.policefoundation.org/striking balance/

FOR MORE INFORMATION ABOUT WHAT'S NEW AT THE POLICE FOUNDATION,
INCLUDING PEOPLE, PROJECTS, AND PUBLICATIONS,
VISIT OUR WEB SITE
@
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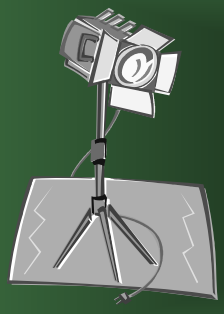

Crime Mapping News Spotlight

Port St. Lucie Police Department

The Port St. Lucie Police Department serves the city of Port St Lucie, which encompasses approximately 115 square miles (see Figure 1). The city is located on the east coast of Florida and both the city and the agency have seen tremendous growth—from eight officers and a population of 16,000 in 1980 to the current 254 sworn personnel serving a citywide population of approximately 167,000. Port St. Lucie is located in St. Lucie County, roughly 50 miles north of Palm Beach. The city is home to the New York Mets spring training facility, a satellite campus of Florida Atlantic University, and the newly built Torrey Pines Research Center. A newly constructed civic center will serve as a hub in the formation of a downtown district, currently lacking in the city. With the varied demographics and growth issues affecting different portions of the city, crime types and statistics also differ, particularly theft from vehicles and residential burglaries.

Throughout its growth, Port St. Lucie has been able to maintain its reputation as a safe city, earning the distinction of safest city in Florida for population over 75,000 for seven consecutive years, 1998-2004. In 1999, the department initiated its Statistical Tracking, Accountability, and Response through Computer Oriented Mapping (STARCOM) program, modeled after New York City Police Department's Compstat program. Initially, two analysts provided information in the form of quarterly and annual reports based on Uniform Crime Report data. At the time, the analysts provided no tactical pattern analysis or trend analysis to help with crime reduction as both the city and the agency continued to grow nor did they provide mapping for the purpose of crime pattern analysis.

To better develop crime patterns, trends, and relevant statistical data, a crime analysis unit was formed in December 2005 to create and disseminate analytical products to ensure accurate and timely analysis and response to crime. Effective November 2008, the Crime Analysis Unit integrated with the Crime Intelligence Unit to form the Crime & Intelligence Analysis Unit. This integration allows the unit to focus on known offenders for inclusion in analytical products, which in turn produces a more comprehensive analysis.

The Port St. Lucie Police Department started using a systematic response to crime analysis patterns in 2006. A committee was developed to establish procedures for crime pattern analysis and included lieutenants, patrol and detective sergeants, detectives, and crime analysts.

From the committee's recommendations, the Port St. Lucie Police Department decided to categorize crime pattern analysis based on solicited and unsolicited requests. The solicited analysis is conducted by the crime analysts at the request of staff, and the unsolicited analysis is conducted routinely on a daily basis without prompting from requests. In addition, the committee categorized specific crime/ incident types for either solicited or unsolicited analysis. The following are some of the unsolicited analysis incident types that are routinely analyzed by the crime analysts routinely: theft from vehicles, residential burglaries, business burglaries, construction site burglaries, thefts, vandalisms, suspicious incidents, and field interviews. Alternatively, solicited analysis is conducted based on request that include some of the following incident types: robberies, sexual battery rapes, "peeping tom," stalking, loitering and prowling, and fires/arsons.

In conjunction with identifying the types of incidents the crime analysts would routinely analyze, the Port St. Lucie Police Department utilized five pattern definitions for tactical crime pattern bulletins, which include (Boba 2008):

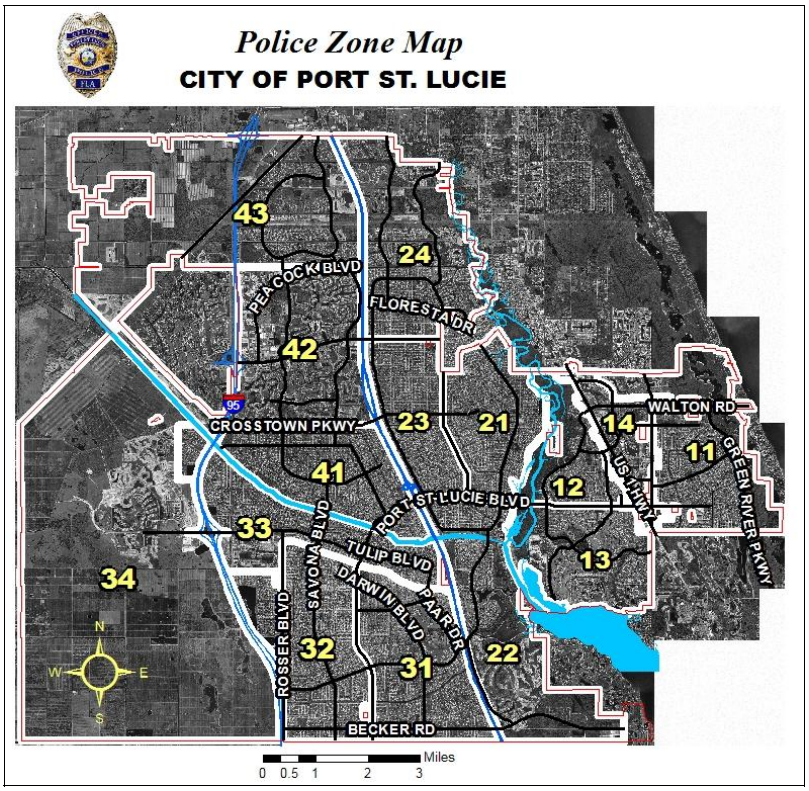

Figure 1. Police Zone Map of the city of Port St. Lucie

- Series is a pattern "run of similar crimes committed by the same individual(s) against one or various victims or targets."
- Spree is a pattern "characterized by a high frequency of criminal activity to the extent that the activity appears almost continuous…involve the same offender(s) and usually occur over a short time span, with no cooling off period, and are considered more specific than a series."
- Hot Spot is "a specific location or small area where an unusual amount of criminal activity occurs over a short period of time that is committed by one or more offenders."
- Hot Target is "a type of place that is frequently victimized over a short period of time, but the actual locations of the places are not necessarily in the same area."
- Hot Product is "a specific type of property that is the target in the same or different types of crime."

To ensure that personnel were addressing patterns effectively and consistently, the Port St. Lucie Police Department implemented a system for automatic response. When a pattern is published by the crime analysts, personnel from all divisions (e.g., patrol, criminal investigations, crime prevention) contribute to the responses in a consistent manner. The pattern bulletins (example shown in Figure 2) are immediately posted to the agency's intranet system (i.e., Portal) for review by sworn personnel. A pattern discussion board within the Portal provides officers the capability to post discussion threads of information about their responses as well as their knowledge of the pattern area, known offenders, or of field interviews that have been conducted. It also allows supervisors to monitor whether appropriate responses are taking place. The threads enable commentary to occur in "real time," allowing information that was once passed by word of mouth to be reviewed by all personnel. This helps to inform all police personnel who are responsible for responding to a pattern about the progress of the current pattern response.

The shift lieutenant is accountable for overseeing responses for each pattern. Within the systematic pattern response, the type of pattern dictates the level of response and amount of resources that are expended. For example, a spree pattern bulletin prepared by the analysts generates both directed patrol and assistance by Community Programs, in the form of automated reverse-911 calls, both within the pattern area. Depending on the nature of the crime (e.g., auto or residential burglaries), a volunteer response team may be instructed to disseminate crime prevention pamphlets in the area as well.

In response to hot spot and hot target bulletins, the systematic response includes directed patrol and criminal investigations, if deemed necessary by the discretion of the shift lieutenant. For example, this involvement may include the use of a bait or video car and/or surveillance with unmarked vehicles for theft from vehicle patterns. Community Programs is involved in this pattern response as well, in the form of volunteers and automated reverse-911 calls. Pattern response accountability is addressed at the monthly STARCOM meeting at which time captains report the results of the systematic responses.

ESRI's ArcGIS is the Port St. Lucie Police Department's primary tool for crime pattern mapping. The crime analysts utilize many shapefiles that are maintained by the city's Geographic Information Systems (GIS) division. The GIS division provides the crime analysts with continuous updated shapefiles of the city's streets,

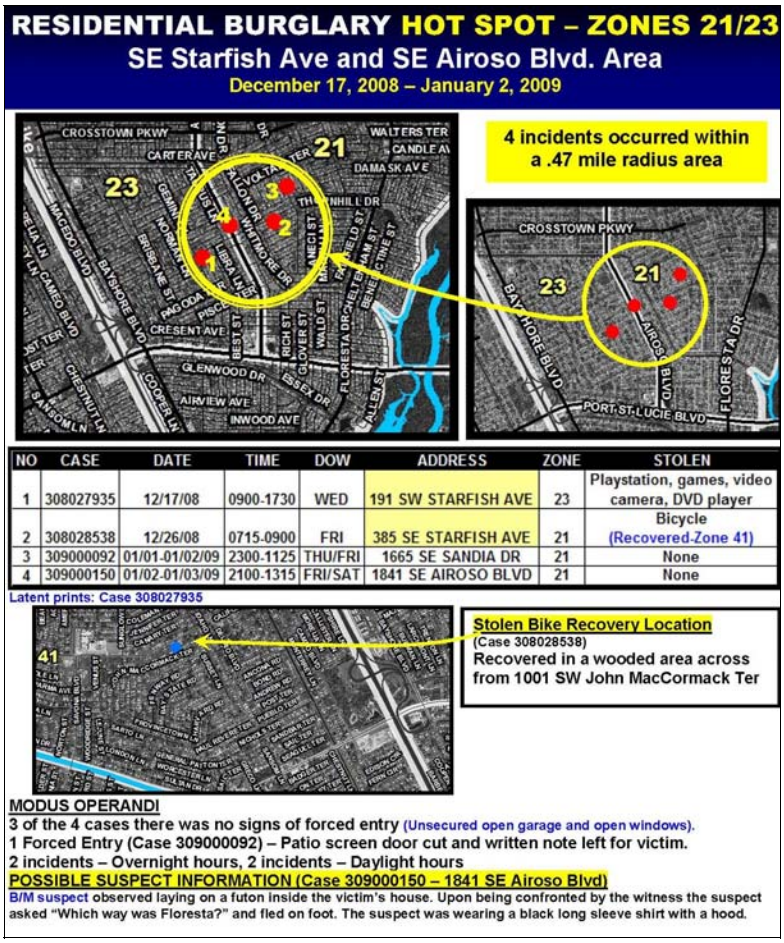

Figure 2. Hot spot pattern bulletin for residential burglaries

highways, police districts, parcels, and city limits. The support of the GIS division is essential to the efficiency of the crime mapping functions of the police department. The crime analysts also receive information technology (IT) support from the police department's internal IT department. The IT department maintains layers of crime locations and known offender address locations that are linked to the record's management system (RMS). This function is critical to the timeliness of the crime pattern identification and dissemination process. The crime analysts are able to utilize the functions of both GIS and IT to create accurate and timely tactical crime pattern bulletins. The crime analysts are able to focus their time on the analysis of the crime patterns and not the technical aspect of mapping the crime.

The integration of crime intelligence with crime analysis has allowed the crime analysts to incorporate known offender information with crime locations in ongoing patterns. The crime analysts routinely overlay known offender address locations in the vicinity of a pattern. The additional layer of juvenile and adult offenders allows the crime analysts to focus on offenders that have a criminal history similar to the crimes within the pattern. If a known offender is identified to be residing in the area or stopped in the area of the pattern location, the analysts include the subject's information on the bulletin. The inclusion of known offender information on pattern bulletins can be beneficial to patrol officers and detectives.

With the integration of crime analysis and crime intelligence, analysts initiate the responses and subsequent communication between the patrol division and the criminal investigations division. This incorporation of crime analysis and criminal intelligence enables analysts to continue to develop analytical products which will further benefit the Port St. Lucie Police Department.

Reference:

Boba, R. (2008). Crime analysis with crime mapping (pp. 153-155). Thousand Oaks, CA: SAGE

This article was authored by Michelle Chitolie and Cheryl Davis of the Port St. Lucie Police Department.

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Upcoming Conferences and Training

JULY

Advanced Analysis with ArcGIS in select cities (ESRI):
Veinna, VA; Harrisburg, PA

Working with ArcGIS Spatial Analyst in select cities (ESRI):
Charlotte, NC

CrimeStat III for Crime Analysts (NIJ):
July 27 - 29
San Diego Sheriff Computer Lab, CA

Introductory & Level II MapInfo Professional training in select cities:
Lanham, MD; Troy, NY; Denver, CO; Des Plaines, IL

AUGUST

Advanced Analysis with ArcGIS in select cities (ESRI):
Seattle, WA

Working with ArcGIS Spatial Analyst in select cities (ESRI):
Vienna, VA; St Charles, MO; Redlands, CA

Intermediate Crime Mapping & Analysis Using ArcGIS 9.3 (NIJ):
August 10 - 14
San Diego Sheriff Computer Lab, CA

Introductory & Level II MapInfo Professional training in select cities:
Atlanta, GA; Toronto, ON; Troy, NY; Denver, CO; Des Plaines, IL; New York, NY; Addison, TX

GENERAL WEB RESOURCES FOR TRAINING SEMINARS AND CONFERENCES

http://giscenter.isu.edu/training/index.htm
http://msdis.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.ojp.usdoj.gov/nij/maps/training.htm
www.justnet.org/Pages/cmap.aspx
www.nsgic.org
http://www.urisa.org/webinars
http://ocpe.gmu.edu/certificate_programs/gis.html
http://www.worldcampus.psu.edu/GISCertificate.shtml

Looking Ahead in 2009!!

NIJ MAPS Conference
August 19 –22, 2009
New Orleans, LA
http://www.ojp.usdoj.gov/nij/maps/

International Association of Crime Analysts & and the Arizona Association of Crime Analysts are putting together the upcoming IACA conference
October 12 - 15, 2009
Scottsdale, AZ
http://www.iaca.net

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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This Police Foundation Crime Mapping and Problem Analysis Laboratory operates with the goals of providing practical assistance and information to law enforcement agencies and to developing the physical and theoretical infrastructure necessary for further innovations in police and criminological theory.