Crime Mapping News

POLICE FOUNDATION

Inside this Issue

The topic of this issue of the *Crime Mapping News* is how mapping and analytical techniques can be used both in preparation for and in response to terrorist events such as those that occurred on September 11th, 2001. The articles in this issue cover topics including 1) a perspective on the analyst's role in supporting counterterrorist activities, and 2) an overview of how GIS has been used to model the World Trade Center site. We have also included an article describing the use of ARCBridge's CRIMESolv™ software at the Anne Arundel County, MD, Police Department. Lastly, we present a "Crime Analysis Challenge" composed of nine questions designed to stimulate thought and discussion.

Closing the Barn Door:
Police Counterterrorism After 9-11
From the Analyst's Perspective

by Dan Helms, Crime Analyst
Las Vegas, NV, Metropolitan Police Department

In the wake of the recent devastation inflicted against US citizens (and others) by terrorist operatives working on US soil, many eyes within our professional community of police crime analysts have turned toward the problems posed by what many feel is an increasing terrorist threat. Although traditionally civilian law enforcement agencies have left counterterrorism duties in the hands of our federal colleagues, there is definitely a widening role for local and regional police—and in particular for police analysts—in dealing with this deadly menace.

Before we can begin to perform our role in supporting counterterrorist activities, we must first define our place in the greater scheme. It should be perfectly clear to all of us that, although many may perceive terrorism as "somebody else's problem," it clearly consists of criminal activities and is a credible threat to public safety; therefore, it is of vital concern to all law enforcement personnel. As crime analysts, our place within our police and public safety agencies is one of direct support—we provide the information which enables line officers to do their work. This role is unchanged when we consider counterterrorism; however, we will likely wish to revisit our methods, which have evolved to deal with very different types of threats, and to borrow from more experienced experts in the war on terror.

Let's briefly review three primary efforts by which a modern crime analyst can help support counterterrorist efforts: **Investigation, Prevention,** and **Emergency Operations.**

The first role, Investigation, is the one in which many crime analysts will feel most comfortable. Some may feel slightly helpless when faced with the challenges of investigating terrorist activity: How can I, a civilian police crime analyst, possibly investigate criminal activity that may involve dozens, hundreds, or even thousands of interrelated individuals and groups, many of whom operate overseas, speak foreign languages, and use sophisticated methods of operation? In fact, like any other criminal group, terrorists operate according to rules and principles that can be identified, analyzed, and predicted. Thus, their behavior can be investigated and dealt with even more effectively than many more seemingly random types of sporadic criminal activity

involving individual offenders. As strange as it may sound, terrorists are among the most rational of offenders. "Rational" does not, of course, mean the same thing as "reasonable." Rather, it means that the subject behaves in a logical fashion when the situation is viewed from that subject's own perspective. Although it may be difficult to see the logic behind terrorist attacks from our perspective as Americans, it is certainly there. Terrorists can be fanatics, madmen, and fiends—but they are seldom fools. They pick their targets and inflict their wounds with extremely precise calculation. While this makes them in most ways far more formidable threats than conventional, "opportunistic" criminals, it also makes them more vulnerable in the sense that by unraveling their networks, their methods, and their logic, we can accurately forecast their behavior and disrupt their efforts.

     Crime analysts are well advised to begin any investigative effort by contacting the local agencies that are most likely to deal with terror related investigations in their jurisdictions. For most of us, this will be the Federal Bureau of Investigation. Department of Defense (DOD) agencies, such as the Air Force Office of Special Investigations (AFOSI) and its sister agencies in the Departments of the Navy and Army, may also be very useful contacts—almost every police jurisdiction is in proximity to some DOD installation. The US Border Patrol as well as the Immi-gration and Naturalization Service are also present in most communities, as is the US Customs Service. We often forget about federal police agencies such as the US Park Police, the Veteran's Affairs Police, and others who may share our jurisdictions. Now more than ever, it is imperative for local police agencies to join hands with our federal colleagues. Although only the Department of Defense and the US intelligence community (consisting of the National Security Agency, the Central Intelligence Agency, the Defense Intelligence Agency, and smaller but important tributary organizations such as the National Reconnaissance Officer) have built-in mechanisms for sharing information, all federal agencies tend to do a better job of sharing timely and accurate intelligence than do their state, regional, and local brethren. Many police personnel may have had bad experiences trying to extract information from "the Feds" in the past; and of course, rules governing classified information and Posse Commitatus prevent federal agencies from sharing many items with us. Even so, many requests for information will be granted, giving the local police access to up-to-the-minute intelligence from a multitude of sources. The US Air Force OSI, for example,

is part of the world's largest counterterrorism intelligence network and has a mandate to support local law enforcement whenever possible—making your nearest Air Force Base a potentially excellent source for fast and accurate data of the type that we, as analysts, desperately need.

     The majority of counterterrorist investigations consist of "Intelligence" related activities; that is, operations and analysis that focus on individual targets (such as suspected persons, groups, or targets), and progress by following a chain of information to expose as much of the enemy as possible. For example, a single anonymous tip or a lucky traffic stop might be enough to initiate a surveillance of a suspected person. Personal contacts, phone taps, mail interceptions, banking transaction histories, prior living arrangements, or educational history may then reveal other potentially suspect individuals, groups, or places, which may then in turn be traced for still more leads, and so on. This is the fundamental process of link analysis, or network analysis, which is well understood within the crime analysis community and has been used for decades as a proven method for rooting out organized crime groups, criminal rings, and street gangs with great success. Counterterrorist investigations are basically identical, with three significant differences.

     The first dif-ference between counter-terrorist investigations and those of more domestic groups is the scale of research required. Most local crime analysts have never tried, for example, to obtain police records from Interpol or Europol, or checked with Jordanian Border Police to see whether or not a suspect has a criminal record with that agency. How often have you tried to contact Israeli Security forces to check on whether or not a person is named on their "watch list"? Probably not too often. But you certainly can if necessary, and in the case of global terrorist investigations, you may need to. These agencies are approachable, and they have telephones, e-mail, and Web sites just as we do here. Make use of these resources to make your investigations work.

     The second difference is in regard to legality. For example, the National Security Agency (NSA) of the US is the world's most competent and powerful eavesdropping organization. However, the NSA does not listen in on Americans, even when they are abroad, unless certain clearly defined conditions are met. This is because the rights of Americans to privacy and, in the words of the Fourth Amendment, to be secure in their persons from unreasonable search and seizure, are constitutionally protected. Although many "conspiracy theorists" may sneer, in fact the NSA strictly adheres to these legal principles as well as a lengthy

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"moral code" governing the propriety of their operations. For the local crime analyst, the situation is usually much more rigidly proscribed. American police operate under tight bounds. The rights of suspect persons must be strictly observed, and even illegal aliens are protected by the same rights which guard US citizens. This means that the crime analyst must be circumspect when performing his or her analysis, even in the case of terrorist incidents. The crime analyst who compiles a database containing the names of all Arab Americans who have obtained driver's licenses in his jurisdiction is treading on legal quicksand. Even the catastrophic events of recent weeks have not countermanded the constitution—thank goodness.

The third and final key difference in counterterrorist investigations is that we must never work alone. It is perfectly sensible for most of us to conduct our investigations within the invisible walls of our jurisdictional boundary and never inform even our neighboring agencies of our actions. In the case of counterterrorism, however, this is the opposite of the correct procedure. No local agency should ever develop leads, perform surveillance, or obtain information pertaining to these activities without first coordinating these efforts through the appropriate federal agency, in most circumstances, the FBI. Even if you feel your agency's partnership with the FBI to be one-sided or counterproductive, it is absolutely essential that you not proceed alone. For the crime analyst, this means informing your chain of command of your efforts as touching counter-terrorist investigations and letting your interagency liaisons do the rest. Having said that, however, it should be noted that federal authorities rely heavily on exactly this sort of close cooperation with local agencies to do their jobs. So, do not decide to do nothing—act, but coordinate your actions appropriately.

Even better than a successful Investigation is an effective Prevention. This is accomplished by denying the terrorist the opportunity to successfully attack in the first place. Crime analysts are in a uniquely suitable position within their agencies to perform this task.

Unlike planners, administrators, or sworn personnel, crime analysts have available to them the complete range of information concerning their jurisdiction and the tools

with which to process and analyze it. For example, business license files, utilities, known criminals, streets, waterways, radio frequency assignments, telephone records, school records, and much more are at the fingertips of the modern crime analyst. These data are already used by good units to perform more routine crime analysis. They are also essential to effective terrorism prevention.

The process should begin with a Threat Assessment. The analyst should take (or make) the time to review his or her complete jurisdiction: geographically, sociologically, demographically, and politically. Identify targets based on their risk. Risk can be evaluated through a variety of documented methods. Like any other criminal, the terrorist must have motive, means, and opportunity. Therefore, look for targets that would motivate a terrorist, which he would have the means to attack, and which he would have the opportunity to strike.

For example, perhaps the most obvious single strategic target in the Las Vegas area is the Hoover Dam. This location would be at substantially elevated risk from the standpoint of motivation because it is such a multifaceted target: a symbol of national pride; would result in high numbers of deaths, injuries, and property damage; would be difficult and costly to repair or replace; would inflict lasting economic damage from loss of electrical generating capabilities in the Southwest; and would critically threaten the water supply for Las Vegas. Also, its threat potential is high from the standpoint of opportunity, since it lays along a major highway and is open to civilian traffic, despite enhanced security precautions. However, from the standpoint of method, the dam is a very poor target. It is too tough for most terrorists to attack. A truck bomb would have no effect whatsoever other than as an anti-personnel device. Only military weapons or professional demolition would provide easy means to actually destroy this target; therefore, we might place other regional assets at a higher risk level— such as the water supply in Lake Mead or our large hotel-casinos and convention centers.

Once we have developed our prioritized list of threatened sites, persons, and things, we can begin to construct countermeasures. The method we follow in order to do this is essentially the SARA process, already widely used for

Hoover Dam
C45-300-021094

Photo courtesy of the United States Department of the Interior Bureau of Reclamation, Lower Colorado Region.

tactical crime analysis. We Scan to identify weaknesses that make our target vulnerable. We Analyze to find ways to circumvent these weaknesses. We Respond by implementing countermeasures. We Assess by testing our effectiveness. Then the process begins again.

For example, consider the problem of preventing a terrorist attack against a major resort casino. First, we scan for obvious vulnerabilities. We begin with known techniques, then explore new ones. One well-known terrorist technique which could be devastating in a casino is the Suicide Bomber, although hitherto unknown in the USA, an attack we can expect in the future. Next, we analyze this method of attack to determine counter-measures. In this case, we can reduce the threat with a variety of methods: traffic control in front of the casino can prevent crowds from building up, reducing the number of targets; barrier walls can be constructed to provide blast deflection; within the casino, heavy slot machines and other obstacles can be placed to provide increased protection; increased security at entry points can improve our chances of detecting persons carrying suspicious packages or wearing bulky clothing—these can be intercepted by security personnel before entering the building; ordinances and rules can be enacted to allow for luggage searches; changes can be made in valet parking and bell service to keep cars and luggage away from common areas; bomb dogs can conduct random sweeps. In fact, there is plenty we can do, isn't there? No one perfect solution presents

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itself, but it seems possible that we can enact at least a credible defense that can reduce the risk at our targets. We can then respond by allocating the necessary police resources, work with the community and government to provide for the needed support, and implement our countermeasures. Finally, police personnel can perform periodic readiness tests and exercises to assess our effectiveness. Then we begin the process all over again by scanning for other threats…What about a rooftop sniper? Takeover of a tourist helicopter? Poison gas attack? Time bombs? Arson? And so on.

The role in which the crime analyst can perhaps be most effective in counterterrorism is also perhaps the one we would least like to fill—Emergency Operations. All accredited law enforcement agencies in the US perform regular and often extensive planning for disasters, catastrophes, and even terrorist atrocities. Most have adopted Incident Command structures and regularly test Emergency Operations Centers, Field Command Posts, and otherwise ensure their ability to deal with a variety of crises. Unfortunately, these measures seldom meet with optimum success. Although we continually try to plan for every imaginable contingency, we often fail to prepare to enact our plans, even when they are accurate; moreover, we often fail to

consider in advance our options for doing so.

The events of 9-11 are a perfect case in point. Following the destruction of the Murrah Federal Building in Oklahoma City by a terrorist truck bomb attack, the difficulties of sifting through wreckage and rubble to search for survivors were demonstrated to the entire nation. One leading innovator, Jim Howard, managed to develop an on-the-fly single-structure GIS of the building, which enabled him to help prioritize relief efforts by predicting where bodies—even survivors—would be found. [Editor's note: see page 6 of this newsletter for an article by Jim Howard.] Moreover, this 3D GIS enabled investigators to analyze the blast mathematically, vastly enhancing investigative searches for evidence and allowing them to better piece together the events leading up to the attack. Unfortunately, these lessons were lost on the majority of crime analysts, who have not felt that "data gathering" of this sort falls within their duties. With the fall of the World Trade Center's (WTC) Twin Towers, the lessons learned in Oklahoma must be re-learned. Fortunately, being both modern and high-profile, 3D GIS data for the WTC was available to rescuers and public safety personnel in a timely manner. Is the same true in your jurisdiction? Do you, the working analyst, have immediate access to structural and design data on high-risk buildings in your jurisdiction? In the past, this question may have seemed absurd—why should you care? In fact, however far you may feel this task is from your duties as a crime analyst, in many public safety agencies, the crime analyst is the only person with access to the hardware, software, and training to make use of these data. Like it or not, it is probable that, in the event of a spectacular attack, if you have not taken measures to obtain these vital data, nobody else will have done so either. Given the ever-increasing nature of the terrorist threat to every part of the US, it seems patently obvious that crime analysts, like everyone else, must expand their roles to include areas previously outside their purview.

When the crisis comes, it is too late to plan. If you have not already obtained the necessary data, performed the necessary analysis, developed the appropriate plans, and put them into practice, you have failed the public that depends on you. The time to prepare is yesterday—but failing that, now, this instant.

If your agency still does not have access to a viable GIS enterprise, obtain it—now. The day after the attack is too late to install ArcInfo. Make certain that you have redundant access to your tools and data. Police stations and headquarters are prime targets as well, aren't they? What good are your 3D plans of your own headquarters, if they are stored on the melted hard drive of your server somewhere in

the rubble? Think ahead.

No matter how we as crime analysts are tasked to support our country's counterterrorist activities, we should be wary of the age-old problem of "Closing the Barn Door After the Horse is Gone." Unfortunately, this is exactly the trap most of us are falling into in the aftermath of 9-11. Although we can and must increase airline security through a variety of measures—and are doing so—the problem of airliner attack is in the past. By concentrating our efforts on dealing with the situation we have just faced, we may fail to deal with situations that develop in the future. In the past, generals have been accused of always "preparing to fight the last war – not the next one." We cannot let ourselves be trapped into that line of thinking. Airline safety is an important priority, but hardly the only one.   The threats posed by suicide bombers, gunmen, commandos, arsonists, etc., are still much greater, just less spectacular. Terrorists are often organized in pseudo-military fashion and adopt pseudo-military methods. This means that they evolve their methods to avoid traps and countermeasures. They do certainly repeat themselves, but only when their methods are effective. It seems likely that measures currently imposed to reduce the threat of airline-hijacking/kamikaze attacks will be effective. It is therefore our task not to think of ways to avoid what has happened before, but to avoid what will happen next.

Many targets vulnerable to hijacking—such as cargo ships, oil tankers, and private yachts—are not being subjected to the same degree of scrutiny and planning which has been lavished all too late on the airline industry. The destruction of large buildings has heightened our awareness and protectiveness of such structures in our own jurisdictions; but what about other structures such as bridges, dams, power transfer stations, radio towers, and the like? Has your agency implemented contingency planning for these, in the event of terrorist attack? Try to consider the problem from all angles, and you may identify some surprisingly overlooked vulnerabilities—mines, for example, are already inherently hazardous places and might be easily sabotaged, killing hundreds. Do you know where the water treatment plants are located that supply your area? How many men and women staff them, and what is their security like, if any? We must deal with these questions. They may not seem to have much to do with "traditional" crime analysis, but for most of our police agencies, there is nobody else available to take on the task. Crime analysts should actively participate in emergency operations planning and contingency training for their agencies, and they should have a command center role clearly outlined.

Although in light of recent events our minds may tend to stay focused on the most spectacular and dramatic of terrorist threats, it would be inappropriate for our efforts to focus exclusively on such. The majority of terrorist incidents around the world are quite small in comparison to the staggering attacks of September 2001. Just as we would be mistaken to focus all our police efforts in catching serial murderers who, though obviously of high priority, are a small minority of criminals, at the expense of preventing sexual assaults, domestic violence, and property crimes, each of which are everyday occurrences; so, too, we would fail if, by concentrating on preventing major attacks, we ignored the more likely threat of individual gunmen and bombers.

Sadly, the scenario played out in New York, Washington, DC, and Pennsylvania was not, as many have erroneously stated, unforeseen. In fact, in the late 1980s, this author participated in defensive exercises in Greece involving kamikaze attack by hijacked airliners against American military installations. Even the popular author Tom Clancy envisioned a strikingly similar scenario in his fictional thriller, *Debt of Honor,* which culminated in a Boeing 747 crashing into the US Capitol building by a radical terrorist pilot. Strategists and intelligence analysts have for years warned us that the US will be increasingly threatened by terrorist attacks right on our own soil in the future, and that prophecy is being fulfilled. We have been warned also against the increasing menace posed by the terrorist use of Weapons of Mass Destruction, including nuclear weapons, radiation poisons, chemical toxins, biological weapons, and genetic weapons. We have all heard the warnings. When they begin to come true, will we all be surprised yet again? Or will we be prepared? The choice is ours to make.

In retrospect, could the tragic events of 9-11 have been prevented? Certainly. In fact, on one hijacked aircraft, even a faction among the unarmed hostages was apparently able to partially retrieve the situation and prevent the terrorists from obtaining their objective, even though the aircraft and hostages could not be saved. In all likelihood, a single armed sky marshal on each aircraft could have prevented any casualties at all! But even if this particular avenue of attack had been denied to them, the terrorists would have found another way. We will always be vulnerable. Our adversaries are resourceful and intelligent—and they will succeed eventually, in getting in some blows. But that does not mean we are helpless. Careful preparation, meticulous planning, and aggressive threat assessment can defeat the overwhelming majority of terrorist attacks and radically reduce the damage inflicted by those that succeed. It should be clear to all of us that, no matter where we are assigned, no matter what our roles have been in the past, the time is now to lay the groundwork for the future and take the first steps to terror-proofing our people.

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Incident-Level GIS
by Jim Howard, President
Disaster Engineering Software Consultants (DESC), Inc.

Like most Americans, I was shocked and outraged at the attack on America on September 11th. But unlike most Americans, I was not surprised when the Twin Towers of the World Trade Center collapsed within minutes of the assault. My involvement in the Oklahoma City bombing and many subsequent "after action" studies have shown me that gravity is one of the primary enemies of a high rise building in distress. The Alfred P. Murrah Federal Building was not blown down by a truck bomb, rather it was pulled down because the bomb eliminated key structural components of the building. The Twin Towers, like the Murrah building, succumbed to gravity when a combination of events assaulted their structural integrity. First, 150-ton projectiles impacted the structures with a velocity in excess of 400 miles per hour. Second, a jet fuel explosion occurred within mille-seconds of the impact. Finally, the resulting fire further weakened the already damaged structural support infrastructure. The fact that the Towers initially survived the first two events is a testament to their solid engineering.

The end result of these events was structural collapse and the creation of an approximate 1,000,000-ton rubble pile with extensive damage and debris in the surrounding area. A rescue and recovery effort is particularly dangerous and nasty in a rubble pile or collapsed building environment. The rubble consists of structural components such as columns, beams, windows, mechanicals, and floor slabs which are comprised of steel, concrete, piping, wiring, and glass. Intermingled with these structural components is the building live load, which consists of office furniture, equipment, supplies, and occupants. Typically in a pancake collapse, the live load will be sandwiched between floor slabs with the vertical spacing depending on the physics of gravity, the weight above, and content between the slabs. At Oklahoma City, the average distance between floors was 12 to 18 inches.

The rubble pile, debris field, and adjacent structurally damaged buildings create quite a problem for Incident Command as members plan a rescue and recovery strategy. A generalized strategy would be to 1) secure the perimeter, 2) clear avenues of ingress and egress for heavy equipment, 3) assign areas of responsibility for search and technical excavation teams, 4) determine and clear areas for crane placement, 5) assign locations for logistical support elements, and 6) begin operations. Strategically, this may seem simple; however, the tactical elements of this strategy are quite complex.

These planning tasks can be greatly enhanced through the use of a Geographic Information System (GIS) at the incident level. An electronic map can form the base that

Satellite photo with 3D Analyst overlay with WTC buildings ghosted.
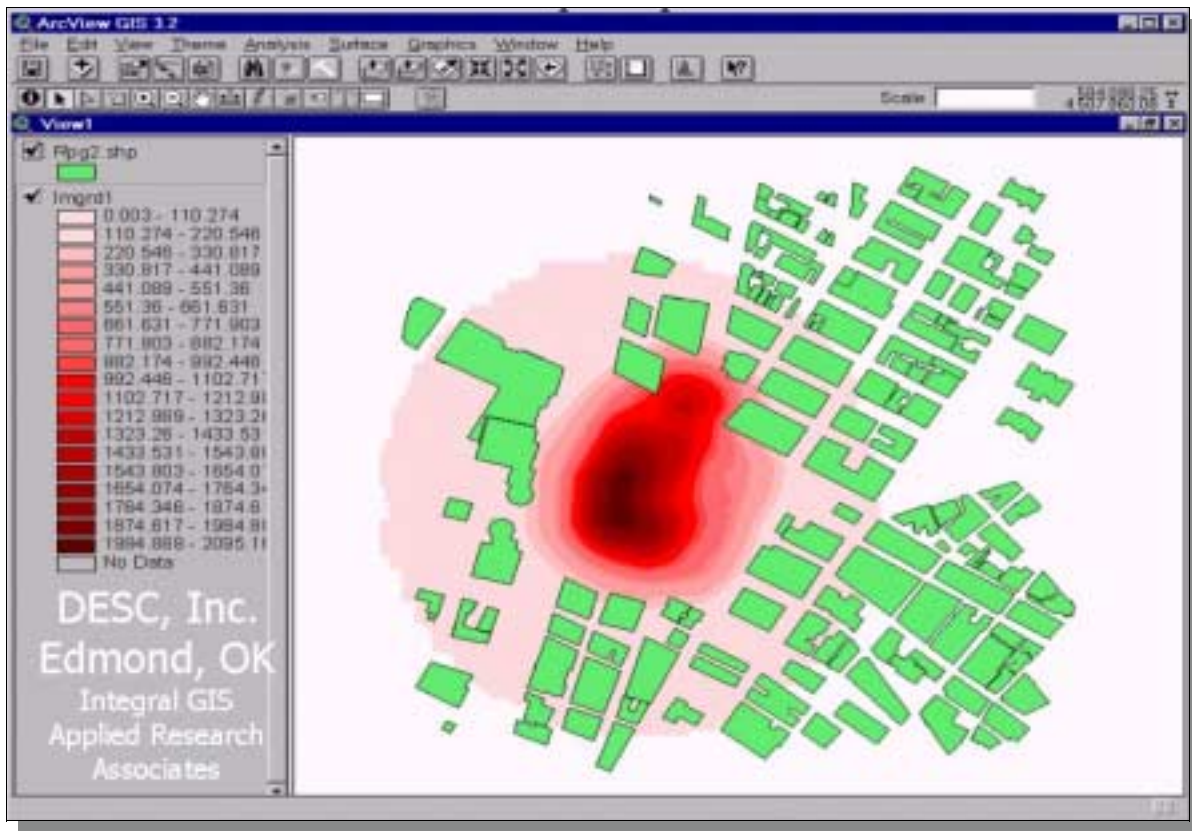
ArcView 2D rubble distribution of WTC neighborhood.

will integrate the total response efforts at all levels of support, from the disaster site to the surrounding community. The municipal Emergency Manager can respond to the disruption of business, services, and city infrastructure. This circumstance is a perfect fit for GIS, which is exemplified by the mapping being done for the Office of Emergency Operations in Manhattan. Even though the area of operations may only cover several city blocks, the flexibility of a GIS allows it to scale down as well as up. In a catastrophe such as the attacks on the World Trade Center buildings, these city blocks become the center of a major and very dangerous work effort. This is the environment where the power of GIS is needed most.

Realistically, we cannot expect a GIS Analyst in every fire truck or police cruiser. However, the technology is here to provide in-vehicle GIS power that does not require a "propeller-head" (rocket scientist) to operate. My company is on contract with the Department of Defense to develop "responder friendly" GIS and CAD (Computer Assisted Design) extensions for the upcoming 2002 Winter Olympics. GUMP (Geographic Utility for Mitigation and Planning) is a light weight map viewer with a "fat button" interface designed as a preplanning tool and will equip the Incident Commander with situational awareness at an incident site. Another tool under development is gCAD, a tool that will help transform architectural floor plan drawings into a "responder friendly" floor plan map suitable for preplanning. In addition, Rubble

Pile Generator (RPG), is a building collapse model that predicts size, weight, and distribution of the debris created from a structural collapse. For example, RPG predicted over 650,000 tons of rubble for the Twin Towers. Other GIS utilities can provide line-of-sight and view shed analysis in an urban environment, which aids tactical teams when planning assaults on shooters or hostage situations.

The time is overdue for responder and incident-level GIS and CAD tools. Developing software for law enforcement and fire/rescue services will not make me another high tech millionaire, but it is the right thing to do.

Jim Howard is the President of Disaster Engineering Software Consultants (DESC), Inc. He can be contacted via e-mail at jhoward@descinc.com.

Geo-Urban Interface for Disaster Operations (GUIDO)/Rubble Pile Generator (RPG) for ArcView 8.1
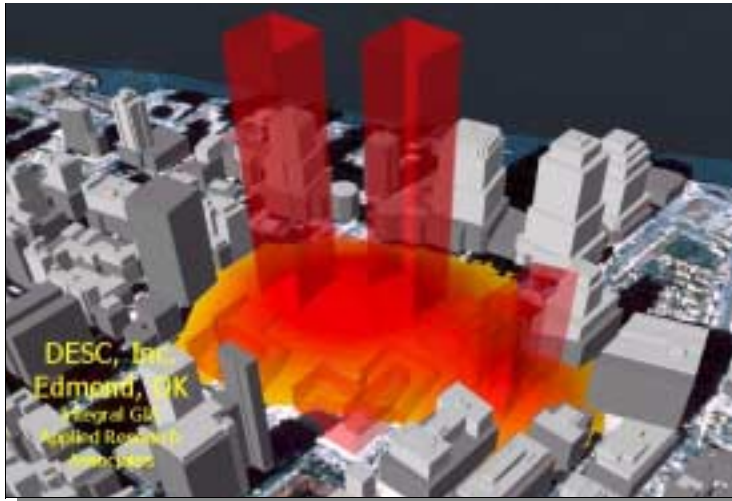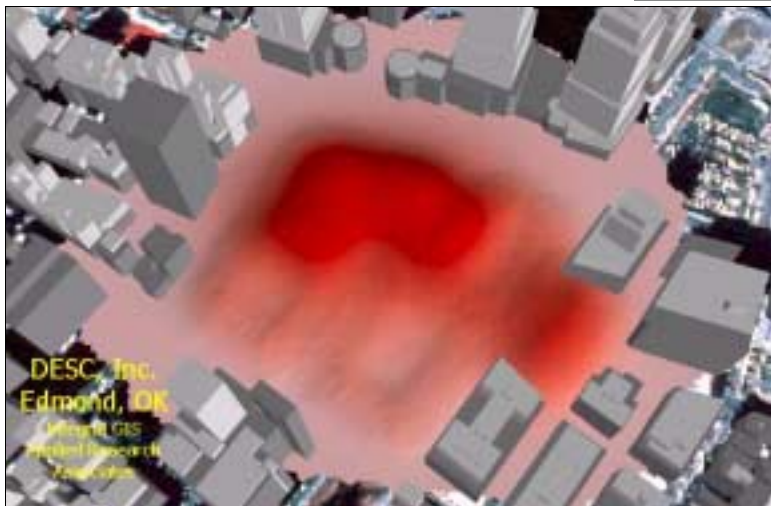

3D Rubble pile in 3D Analyst with WTC buildings ghosted. Gravitational potential energy of one tower equals approximately 270,000 lbs of TNT.

3D Rubble pile in 3D Analyst. Rubble height estimated at 35 to 45 feet based on a 75 lb per cubic foot density.
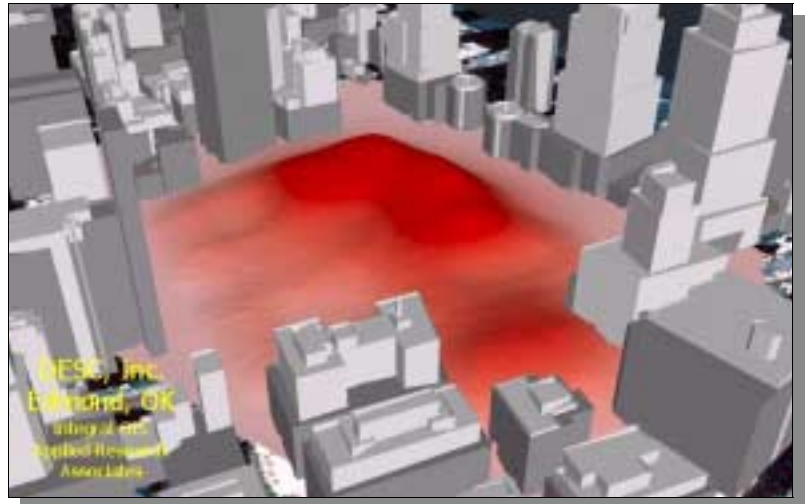

3D Rubble pile in 3D Analyst. Total Rubble - 1,000,000 tons based on an 85 lb per square foot load.

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 made to the articles in order to keep each author's voice and tone.*

Anne Arundel County Police Department Brings Mapping to Crime Analysis

by T.A. "Mickey" Finn and Ken Aung,
ARCBridge Consulting & Training, Inc.
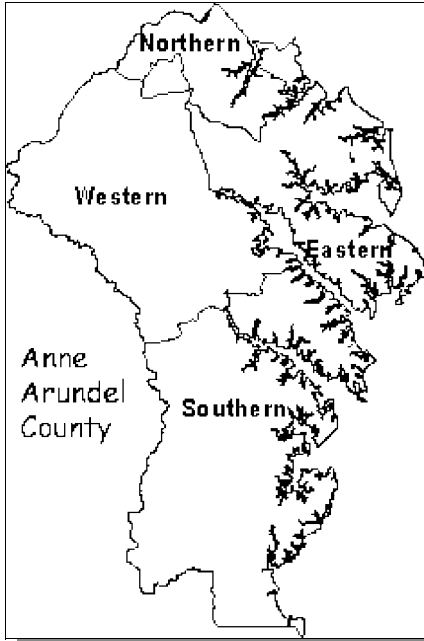
The use of crime mapping technology is fast becoming an indispensable tool for police departments. Department-wide access to the latest crime data is now made possible with CRIMESolv™ client/ server and Intranet tools. Police Chief P. Thomas Shanahan of the Anne Arundel County, MD Police Department (AACPD) has urged the use of mapping technology in the crime analysis unit.

The county was seeking a crime analysis and mapping system that was powerful, yet easy to use, and was suitable for advanced crime analysis as well as the preparation of pin maps and corresponding printed lists of police incidents. The county issued a Request for Proposals (RFP) in 2000, and ARCBridge Consulting & Training, Inc. of Herndon, VA was awarded the contract to provide its CRIMESolv™ system to meet these particular needs of the department.

The Solution

CRIMESolv™ is a full featured and easy-to-use software tool for the mapping, analysis, and reporting of crime data. The capability of CRIMESolv™ to integrate crime data with geographic boundary layers enables AACPD personnel to better examine, target, and reduce crime. CRIME-Solv™ interfaces with existing Computer Aided Dispatch (CAD) and Records Management

Systems (RMS) databases to automatically import data at scheduled intervals, providing departments with the most recent data and reports to analyze.

Key Benefits

The system empowers the department to better allocate scarce staffing and predict crime patterns. CRIMESolv™ can quickly generate maps and reports. The department is now able to track crimes throughout the county with the click of a mouse.

The technology can help the department schedule times and areas for patrols and provide shifts with information for ongoing investigations. It may also be used to:

- Provide the patrol force a better idea of when and where accidents are occurring.
- Help analyze staffing allocation.
- Show patterns of burglaries, robberies, and other crimes.
- Help create new beat areas and times to counter new crime patterns.
- Break down information into areas of the city, day of the week, and time of day.
- Link suspects, arrests, and accomplices to specific crimes.
- Perform crime trend analysis based on data from several years.

Cutting-Edge Technology

CRIMESolv™ uses cutting edge technology from ESRI and Microsoft. Both present key technologies that are integrated into the software. The system is a very powerful tool that can query vast amounts of crime data through multiple years. The user is then presented with data that he/she can visualize. Multiple reports can then be generated from such queries.

"It was important to the AACPD that the application be responsive and scaleable at a reasonable cost. We have anticipated that, as our
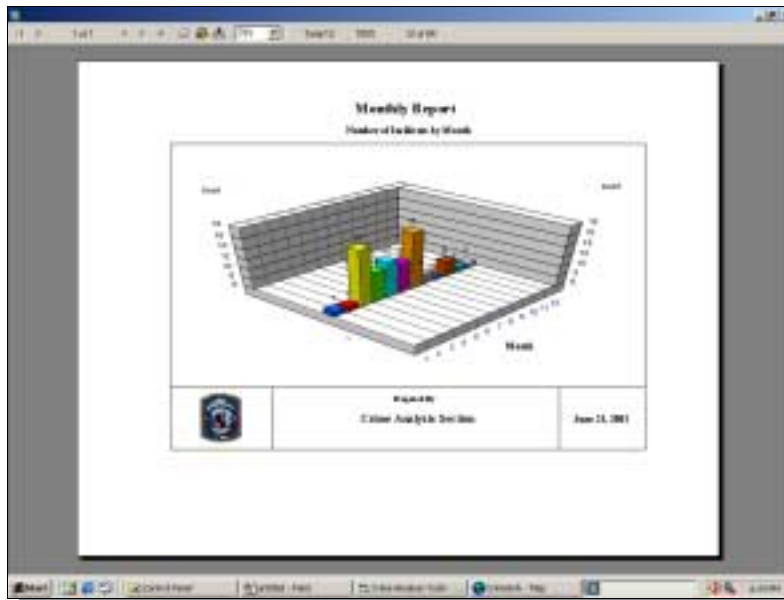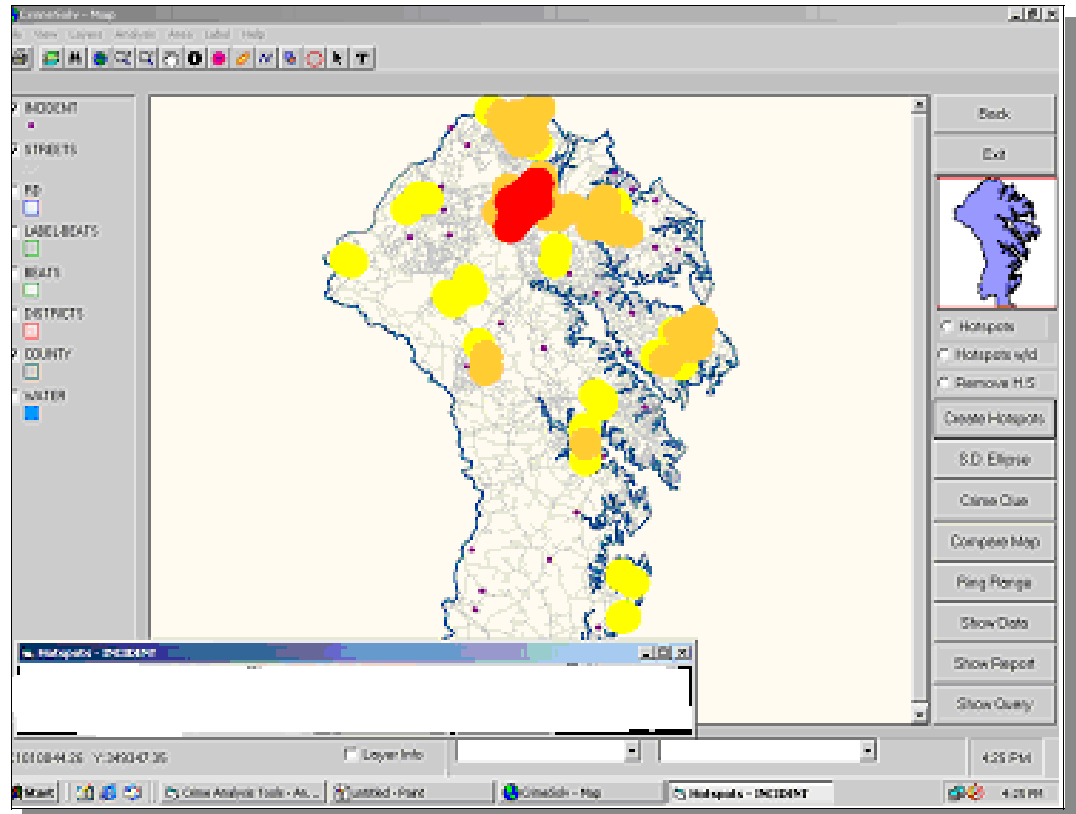

Sample of a quick report generated from CRIMESolv™.

officers and analysts became more familiar with the system, they would demand more from it. While we limit advanced queries and analysis to our crime analysts, we encourage use of the system by the beat officer," reports crime analyst Doris Paszkiewicz. According to Captain Gordon Deans, Commander of the Technology Support Division, the department is very "pleased with the ongoing performance of CRIMESolv™. The system more than meets the requirements set forth in the crime mapping RFP and will be a tremendous asset for our crime analysis operations."

The AACPD system currently services the needs of many officers and crime analysts. The system is not only easy to use but also allows the analyst the ability to construct complex queries

An example of hot spots created on the fly.

of the database. Downloaded nightly, the data are updated every 24 hours with current information from the CAD and RMS. ARCBridge professionals assisted in integrating the two systems to ensure the ability to interface with the geocoded information for display on maps.

One highly sought feature was hot spot analysis. CRIMESolv™ can quickly generate hot spots, standard deviation ellipses, and incident trends right within the software without the need to purchase additional programs. This has proven to be a big advantage. Currently, detectives at each of the seven stations of the department are utilizing the system to help in their investigations. They are pleased with the response of the system and its ease of use. After training, they are surprised how quickly they can use the system in their everyday tasks. The results are visual representations of criminal activity for review by detectives prior to hitting the streets to move their cases forward.

By its very design, CRIMESolv™ has added value and power for law enforcement. Its standards have kept its acquisition price low while the client server model allows great versatility in the use of the system. The feature controls are so powerful that the system can be utilized for crime analysis without a keyboard, only a mouse is needed to produce maps and reports from the database, allowing for timely information retrieval and ease of use for the beat cop and the chief. For the crime analysts, the full power of the SQL database awaits their inquisitive minds.

Results So Far

We see a great future through the use of this system. Training is increasing usage and a number of detectives have begun utilizing the system every day. They have made the use of CRIMESolv™ part of their daily routines.

Future – Customer Vision

The future is in ensuring the use of the system by everyone in the department. To do this economically, the Department plans to implement the CRIMESolv™ Intranet, an ARCIMS edition of the product. This will reduce overall support costs while increasing use and decreasing the bandwidth needed for the application. This technology will deliver the full power of the application anywhere it is needed, including laptop-equipped cruisers. The future also envisions use of ARCBridge's Intranet/Internet version that will allow limited use of the product by the average citizen with only a Web browser, allowing citizens to keep up with crime in the county.

T.A. Finn and Ken Aung work for ARCBridge Consulting and Training, Inc. They can be contacted via e-mail at mick@arcbridge.com and kena@arcbridge.com.

Terrorism Information Web Sites

Based on information posted to the LeAnalyst Listserv since the September 11th attacks, the Crime Mapping Laboratory has compiled a list of Web sites containing national security and/or terrorism-related information. This list is meant to provide readers of the *Crime Mapping News* with general information relating to terrorist threats and response measures. The list is by no means exhaustive, and inclusion of a Web site does not imply endorsement by the COPS Office or the Police Foundation.

Federal Emergency Management Agency
- www.fema.gov

The George Washington University National Security Archive
- www.gwu.edu/~nsarchiv

International Criminal Police Organization (Interpol)
- www.interpol.int

LSU Libraries Federal Agencies Directory
- www.lib.lsu.edu/gov/fedgov.html

National Institute of Justice: Guide for the Selection of Chemical Agent and Toxic Industrial Material Detection Equipment for Emergency First Responders
- www.ojp.usdoj.gov/nij/pubs-sum/184449.htm

National Domestic Preparedness Office
- http://www.ndpo.gov

Naval Postgraduate School Terrorism Resources
- web.nps.navy.mil/~library/terrorism.htm

RAND Publication: Countering the New Terrorism
- www.rand.org/publications/MR/MR989/

The Terrorism Research Center
- www.terrorism.com/index.shtml

US Department of Justice: Terrorism and Domestic Preparedness Training & Technical Assistance
- www.ojp.usdoj.gov/terrorism/technical_assistance.htm

US Office of Homeland Security
- www.whitehouse.gov/homeland

Contacting the Police Foundation Crime Mapping Laboratory:

By Phone: (202) 833-1460
By Fax: (202) 659-9149
By E-mail: pfmaplab@policefoundation.org
By Mail: 1201 Connecticut Avenue, NW
              Suite 200
              Washington, DC 20036

Also, feel free to contact individual Crime Mapping Laboratory staff with questions or comments:

Rachel Boba, PhD, Director
rboba@policefoundation.org

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mvelasco@policefoundation.org

Jim Griffin, Graduate Research Intern
jgriffin@policefoundation.org

NEXT ISSUE

The topic of the next issue of *Crime Mapping News* will be problem analysis—bringing together crime analysis and problem solving. We look forward to your participation in submitting articles for the upcoming issue.

If you are interested in contributing to the next issue or any future issue, please contact the Crime Mapping Laboratory at:

pfmaplab@policefoundation.org
or (202) 833-1460

MAP YAP

Our regular feature, Map Yap, which allows crime analysis and mapping professionals to submit technical questions and comments or critiques of previous articles, will not appear in this issue. Instead, we are featuring a Crime Analysis Challenge (beginning on the next page) with a variety of analytical questions for readers to ponder and debate.

Please continue to send Map Yap questions or comments to pfmaplab@policefoundation.org. They will appear in future issues!

Crime Analysis Challenge

Analysis is defined by Webster as the separating of any abstract entity into its constituent elements, the method of studying the nature of something and determining its essential features and their relations. It is the opposite of synthesis, the combining of constituent elements into a unified entity. Considering the nature of their work and products, most crime analysts are arguably also synthesists. Many analysis and synthesis techniques are based on mathematical/statistical processes. These can be as basic as calculating an average or as complicated as global weather forecasting methods. Such processes involve underlying assumptions and limitations. In turn, the mathematical/statistical processes are simplified models of the real world, built from empirical observations and theories. These also have assumptions and limitations.

While there may be more than one way to approach a crime analysis problem, it should always be remembered that there are correct and incorrect methods. Computerized crime analysis and mapping provide powerful and efficient tools, but they also create the temptation for quick and dirty (or as someone quipped, pretty and meaningless) analytic "solutions." Violations of underlying theory, statistical assumptions, or methodological requirements will result in GIGO (garbage in, garbage out). To the degree that a crime analysis product is taken seriously by police managers, investigators, and/or patrol officers, there is the risk that an incorrectly analyzed situation will result in misdirection with potentially serious implications. "Fast food" crime analysis is dangerous, and simplicity and quickness are poor trade offs for validity and reliability.

The following questions are provided to stimulate thought and discussion. They range in difficulty and complexity and are designed to test knowledge of underlying theories and methods. While some of these problems include traps, they are all based on actual errors we have seen in crime analysis and research products. We will publish the answers in the next issue of *Crime Mapping News.* Answer the questions based only on the information provided. Each question is to be considered separately. The research results, statistics, and maps referenced are fictitious.

We encourage you to post your answers to the Crimemap Listserv (sponsored by NIJ's Crime Mapping Research Center) so there is discussion and debate over the answers.

Question 1
The homicide count has gone from 0 in 2000 to 6 in 2001. This increase has generated the attention of the local media. A reporter has asked what is the percent change in homicide over the last year. How would you answer the reporter?
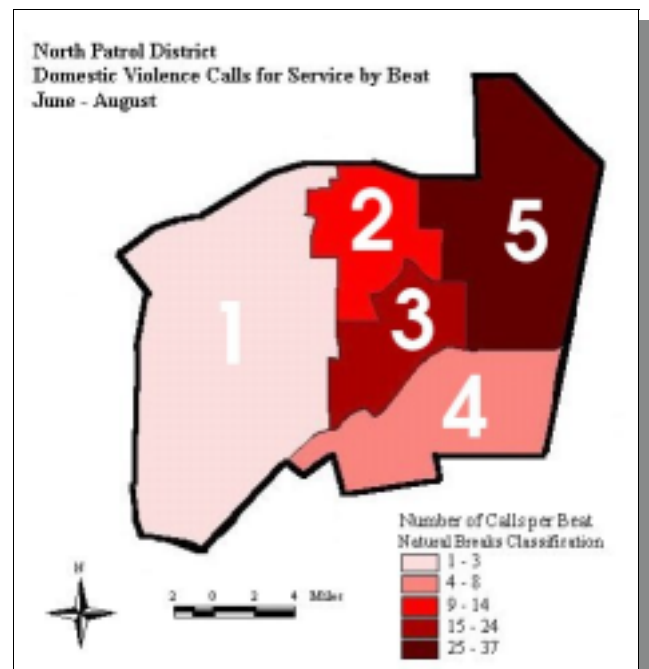
Question 2
Analysis of individuals arrested for auto theft during the past year reveals that of the 68 individuals arrested, 60 were known drug offenders. The Chief asks if this is statistically significant. How would you answer?

Question 3
A comprehensive and thorough study of the prevalence of burglary in the United States showed that there has been a 40% increase in such incidents from 1960 to 1990. A journalist doing a story on crime and parenting asks you what might be the most important contributing factors to this growth. How would you answer this?

Question 4
You are the supervisor of the North patrol district in your city. After a high profile domestic violence homicide, the chief asks each of the patrol supervisors to analyze the domestic violence problem in their district so that the problem can be effectively addressed and chances of a similar occurrence minimized. Your first step is to ask the crime analyst for a map of domestic violence in your district. To the right is the map you receive.

Based on this map, what can you say about domestic violence in your district? What additional information would be valuable?

North Patrol District
Domestic Violence Calls for Service by Beat
June - August

Number of Calls per Beat
Natural Breaks Classification
1 - 3
4 - 8
9 - 14
15 - 24
25 - 37

Question 5

A study of rapists who progress to sexual murder analyzed 106 crime scene variables and found the following characteristics were statistically significant ($p < 0.05$) correlates of future killing: (1) use of a weapon; (2) outdoor attacks; (3) theft from victim; (4) nighttime offences; and (5) multiple sex acts. A serial rapist responsible for 11 crimes over a two-year period has consistently demonstrated 4 of these variables during his crimes. He does not carry a weapon, but rather uses physical force, sometimes excessively so. What can be said about the likelihood the individual will progress to murder?

Question 6

The following table and map detail are an identified bank robbery series comprising 5 incidents:

Incident #	Weekday	Time
1	Monday	1215
2	Tuesday	1440
3	Monday	1330
4	Monday	1610
5	Friday	1020

What prediction about the future events would you make based on these results?

A sergeant wants to deploy surveillance resources on Mondays, from 1100 to 1500 in the area encompassed by the first standard deviation rectangle. Based on these past incidents, what is your estimate of the probability the officers catch the offender during the next robbery through this strategy?

Question 7

A study was conducted of street muggings in Centerville, a typical U.S. mid-western city. Census data indicate that Centerville's population is 49% male, 87% white, with a normal age distribution. The study collected a random sample of 100 street muggings, each of which involved only a single offender and a single victim. The results found approximately 7/8 of such offenders were white, and 13% of victims were non-white. What is the most common race of a street mugger in Centerville? Two anonymous tips have identified possible suspects in a recent unsolved street mugging, Tom Smith, a white 35-year-old male, and Robert Jones, a black 33-year-old male. Based on the study, who is the better suspect?

Question 8

A child molester is active in Edmonton, Alberta, Canada. His victims have all been school children, 7 to 10 years of age, who were accosted while walking on the street alone in the dark. The attacks lasted less than a minute, and none of the victims was transported. The number of offenses by month are indicated in the graph to the right:
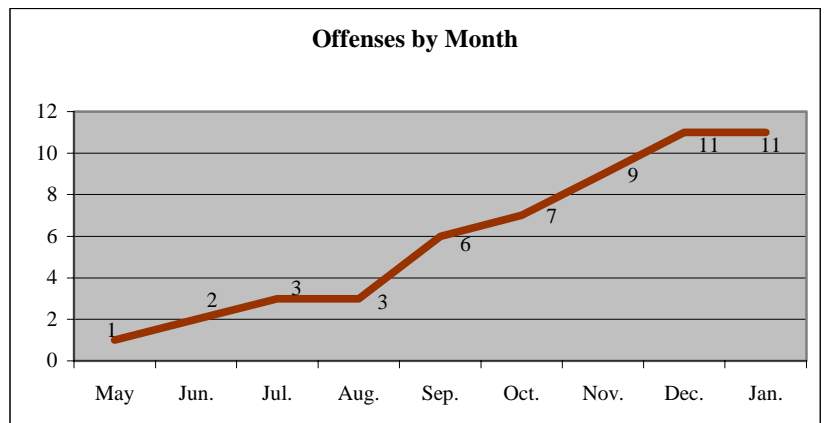
The media claim the molester is escalating his criminal activity. Is this a reasonable conclusion? What factors might explain this pattern? What level of offender activity might you expect in the future?

Offenses by Month

Question 9

Research of non-acquaintance rape victims has demonstrated they have an 80% accuracy rate in describing the correct race of their assailant. A profiling study has shown that Hispanic males are 1.8 times as likely as white males to engage in stranger rapes involving victim transportation. A female visitor to an area comprised of 70% Hispanic males and 30% white males reports such an attack in which she was transported by car approximately 2 miles from the encounter point. The offender is described by her as white. Is this likely to be a correct description? Based on this description, should suspects be prioritized by race? If so, how? If not, why not?

Upcoming Conferences and Training

January

Crime Mapping and Analysis Program (CMAP):
Advanced Crime Mapping and Analysis Training
> January 28-30, 2002
> Denver, CO
> Contact: Danelle Digiosio, (800) 416-8086

Rio Hondo GIS/GPS Public Safety Training Center:
Basic ArcView Training
> January 28-February 1, 2002
> Whittier, CA
> Contact: Bob Feliciano,
> bfeliciano@rh.cc.ca.us or (562) 692-0921

February

Crime Mapping and Analysis Program (CMAP):
ArcView Class
> February 11-15, 2002
> Denver, CO
> Contact: Danelle Digiosio, (800) 416-8086

Rio Hondo GIS/GPS Public Safety Training Center:
Basic ArcView Training
> February 25-March 1, 2002
> Whittier, CA
> Contact: Bob Feliciano,
> bfeliciano@rh.cc.ca.us or (562) 692-0921

March

Crime Mapping and Analysis Program (CMAP):
ArcView Class
> March 11-15, 2002
> Denver, CO
> Contact: Danelle Digiosio, (800) 416-8086

Geospatial Information & Technology Association
(GITA) Annual Conference XXV
> March 17-20, 2002
> Tampa, FL
> www.gita.org

General Web Resources for Training Seminars and Conferences

http://www.urisa.org/meetings.htm
http://www.ifp.uni-stuttgart.de/ifp/gis/
conferences.html
http://www.geoinfosystems.com/calendar.htm
http://msdis.missouri.edu/
http://magicweb.kgs.ukans.edu/magic/
magic_net.html
http://www.nsgic.org/
http://www.mapinfo.com/events
http://www.esri.com/events
http://www.ojp.usdoj.gov/cmrc/training/
welcome.html
http://www.nlectc.org/nlectrm/
http://www.nijpcs.org/upcoming.htm
http://www.usdoj.gov/cops/gpa/tta/default.htm
http://giscenter.isu.edu/training/training.htm
http://www.alphagroupcenter.com/index2.htm
http://www.cicp.org
http://www.actnowinc.org
http://www.ialeia.org

Early Reminders!

The Police Foundation's Crime Mapping Laboratory will be conducting two introductory and two intermediate Crime Analysis Mapping and Problem Solving training courses in late Spring and early Summer 2002. The courses are free of charge, and they are conducted at the Police Foundation in Washington, DC.

The training courses will be announced via fax and over the LeAnalyst and Crimemap Listservs in the coming months. Remember to sign up early to guarantee a spot in the course!

The COPS Internet –

Information on COPS and Community Policing is just a *Click* away

Visit the redesigned and easier to use COPS web site at www.usdoj.gov/cops.

Five key channels provide up to date information on COPS and its programs:

News & Information: For the latest grant announcements, press releases, and upcoming events

Grants, Programs, & Activities: For a list of current funding opportunities complete with application kits and comprehensive descriptions on all our grant programs and more, including training and technical assistance, compliance and monitoring, and program assessment and policy support

Grantee Toolbox: Resources for our grantees including contact information, tips, grant owner's manuals, and progress report forms

Community Policing Resources: A repository of excellent community policing resources including COPS funded studies, reports, curriculums, tools, and tips, conference capsules, ongoing assessments, and promising practices from the field

Freedom of Information Act (FOIA): For FOIA contact information and an electronic reading room, including state listings of all COPS grantees
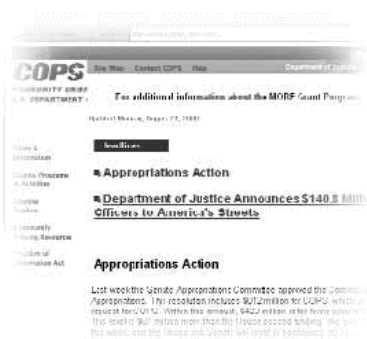
www.usdoj.gov/cops

New material posted to the site daily. Check it often for the latest news on the COPS program.

Visit the COPS site today!

COPS
COMMUNITY ORIENTED POLICING SERVICES
U.S. DEPARTMENT OF JUSTICE

ABOUT THE POLICE FOUNDATION

The Police Foundation is a private, independent, not-for-profit organization dedicated to supporting innovation and improvement in policing through its research, technical assistance, and communications 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.