EYE IN THE SKY POLICING:
UTILIZATION OF GEO SPATIAL IMAGING IN LAW ENFORCMENT

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The Command College Futures Study Project is a FUTURES study of a particular emerging issue of relevance to law enforcement. Its purpose is NOT to predict the future; rather, to project a variety of possible scenarios useful for strategic planning in anticipation of the emerging landscape facing policing organizations.

This journal article was created using the futures forecasting process of Command College and its outcomes. Defining the future differs from analyzing the past, because it has not yet happened. In this article, methodologies have been used to discern useful alternatives to enhance the success of planners and leaders in their response to a range of possible future environments.

Managing the future means influencing it—creating, constraining and adapting to emerging trends and events in a way that optimizes the opportunities and minimizes the threats of relevance to the profession.

The views and conclusions expressed in the Command College Futures Project and journal article are those of the author, and are not necessarily those of the CA Commission on Peace Officer Standards and Training (POST).

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A woman crouches in the shrubs near the newly annexed ten acre reserve, her rapist long gone as her cries go unheard. The sound of a car engine, slowly approaching, paralyzes her with fear. She holds her breath and silently prays both the car and its occupant continue without seeing her. The black and white vehicle, emblazoned with a symbol of a police shield, slowly drives by patrolling the expansive, densely treed park. The officer is overwhelmed by the size and darkness of the park. He silently questions the effect a single officer is expected to make while patrolling a ten acre park. With so many trees, bushes and dim lighting, even if someone was hiding in the thick brush, it was likely he would drive past them without ever knowing.

In the early morning hours, a young man arrives at a construction site in an older, poorly maintained car. As his dented primer Plymouth idles in front of the construction site, he slowly creeps toward a redwood truss stack. No one saw him arrive, place the bomb, or depart from the scene. The neighborhood is awakened as the explosion jolts them from their beds and fire rips through dry framework and redwood trusses.

On another particularly sunny day the synagogue and Beit Midrash, House of Study, was filled with its devoted members. Officer Pratt and Sergeant Smith had signed up for the off-duty synagogue security detail two weeks prior, believing the short day would translate to easy money. While in briefing, Smith mentioned to the shift this particular

temple was a probable target for terrorism. Terrorist acts and threats were rare in this calm, quiet neighborhood; therefore, Pratt felt the threats were idle rumor. Pratt and Smith spent their shift watching the anonymous strangers ebb and flow peacefully as another neighborhood synagogue, a few miles away, made history. The invisible gas released from the metal chamber discretely placed in the front entrance of the second Beit Midrash killed seventy-five innocent people and injured several others.

While these scenarios are fictional, the events are not. Rape, unfortunately, occurs on a frequent basis while eco terrorism attacks, such as the destruction of a construction site, may be remote and random. While the third scenario has yet to occur on American soil, it would have a devastating effect on the nation as well as any local community. The ripple effect, a direct result of the act, resonates for months, sometimes years. On the pages that follow, we will look at a technological solution, not only to enhance the capture and prosecution of these crimes, but to ***prevent*** them from occurring.

Precognitive action-oriented policing; the prevention of crime before it can be carried out, is a by-product of emerging unmanned aerial vehicle (UAV) technologies. This will propel organizations forward; resulting in a departure from traditional crime prevention techniques such as neighborhood patrolling, community education and Crime Prevention Through Environmental Design (CPTED). Policing with UAV's also provides real time, eye-in-the-sky view of events in progress. Geospatial monitoring via UAV allows police to use images in real time to discern possible suspicious circumstances, persons or vehicles. This seemingly "precognitive call for service" can alert law enforcement to circumstances before an actual crime might take place. Even in a crime's aftermath,

geospatial images can be used to locate and identify suspects and their locations. Dispatchers, using UAV images as a means of crime prevention, may prevent a rape, an arsonist from igniting a construction sight or perhaps a terrorist act before tragedy occurs. Precognitive action, thanks to images provided by a UAV, is a viable resource due to new technologies emerging today.

CCTV

According to Benjamin Gould, author of CCTV and Policing, law enforcement organizations are working towards the improvement and implementation of varying types of technology to prevent, respond to and investigate crime.[1] This includes the enhancement of historical CCTV (closed circuit television) devices and the introduction of geospatial imaging devices (which are defined below). CCTV enhancement supports the movement into the digital imaging world as the advantages have been both tested and proven. Alan Michael, Minister of State, said, "The advantages of CCTV, properly managed, speak for themselves: crime prevention, the deterrent effect of knowing there is observation, the alerting of police at an early stage to stop dangerous situations from escalating, the operational assistance to police in sizing up a situation, the safer convictions that can be obtained- the savings in court time can be enormous- and, above all, the fact that peoples confidence is renewed which has led to many town centers being revitalized. Vulnerable groups in particular feel the advantage."[2]

[1] CCTV and Policing: Clarendon Studies in Criminology, Benjamin Gould
[2] A. Michael (Minister of State) (July 30, 1997) Hansard House of Commons Debates (London: HMSO), col. 41

What is geospatial digital imaging?

The most common association is satellite imagery which is a term applied to just about anything in the air taking photos of the earth. A geospatial digital imaging device is a satellite or airship which soars at various altitudes, transmitting images from its camera, via down link connection. There are outer layer satellites, high altitude recon aircraft such as the Global Hawk, mid altitude recon aircraft such as Predator B and at lower altitude levels, small unmanned air vehicles, know as UAV's.[3] The UAV is a preferred device as the costs are lower and they are easier to maneuver and launch. Devices may be tethered and released via cable into airspace; a series of, or, a single satellite; or an unfettered, remote controlled unit which is manually launched into airspace. According to Mark Bateson, inventor of the UAV-1, costs of these devices vary depending upon how they are equipped.

A digital microwave down-link for a UAV is very expensive as it is relatively new technology and may drive the costs up towards the 130,000 range. However, the UAV-1, for example, starts at 35,000 dollars. This has proven down-link technology and includes the camera, aircraft and computer. These devices, outfitted with cameras and infrared, are released into the atmosphere and can transmit real time imagery to a communications center, police vehicle or command post. The design of geospatial devices varies on its capability and function. Some appear to be enhanced, blimp like versions of CCTV (closed circuit television) while others resemble a small remote controlled airplane. A UAV adds the feature of mobility, allowing for precognitive policing and immediate

[3] http://www.fas.org/irp/program/collect/global_hawk.htm; http://www.globalsecurity.org/intell/systems/predatorb.htm

tactical response. It is elusive and provides a 360 degree visual without limitations of mounts. Some examples of these UAV devices are:

- CyberBug- The CyberBug is a high tech asset for military, law enforcement and commercial applications. The unmanned air vehicle can be assembled in minutes and launched from an open area to provide instant aerial surveillance. The vehicle flies for an hour, transmitting video and data to a portable ground control station. The CyberBug operator can safely monitor dangerous events, see around buildings, over hills and beyond line of sight. Applications include search and rescue, traffic monitoring, environmental research, border patrol, drug interdiction and more. Construction includes a pan/tilt camera, gyro-stabilization for high quality imagery, GPS (Global Positioning System) camera tracking, autonomous flight modes including waypoint navigation, automated landings and convoy following.[4]
- CyberScout- Similar to the CyberBug but with the mobility of a helicopter and larger, easier to detect visually.
- UAV1- A new UAV which locks onto a latitude/longitude coordinate (generally associated with a fleeing vehicle or person) and follows, while in flight, a suspect vehicle resulting in tactical, stealth surveillance. The UAV1 is similar in design to that of a remote control airplane. The difference is it has a retractable camera positioned in the nose of the plane allowing for aerial down linking and also remains airborne for over two hours. The operator also registers a flight plan with

[4] CyberBug/CyberScout December 12, 2004 Proxity

the FAA pertaining to the flight pattern of the UAV, thereby satisfying FAA requirements.[5]

According to Mark Bateson, inventor of the UAV-1, expanding threats (e.g., terrorism, weapons of mass destruction) increases in crime and budget pressure are forcing law enforcement agencies to look to technological capabilities to more effectively perform their missions. The concept of having a small, very maneuverable, unmanned air vehicle (UAV) that can be operated by officers in the field to provide overhead surveillance, remote sensing, communications relay or ultimately the 'fly on the wall' surveillance capability has great appeal.[6] Recently there has been an emergence of these devices in law enforcement. These devices are being used to police events, provide tactical surveillance during hostage situations and identify persons in search and rescue operations.[7]

Why geospatial imaging for Policing?

A police department is a civil organization whose members are given special legal powers by the government and whose task is to maintain public order and to solve and prevent crimes. Law enforcement agencies ***exist to serve their communities***. Police departments are being pressured to maintain or heighten current levels of service and increase quality of life.[8] Judson Jeffries, an associate professor of political science

[5] Interview with UAV-1 creator Mark Bateson, contracted I.T. UAV expert with both Sacramento City Police and Roseville Police Departments
[6] Applications for mini VTOL UAV for Law Enforcement; Murphy, Cycon, Space and Naval Warefare Systems Center, San Diego, Sikorsky Aircraft Corporation
[7] Interview with UAV-1 creator Mark Bateson, contracted I.T. UAV expert with both Sacramento City Police and Roseville Police Departments
[8]Unrealistic Expectations of Policing: Controlling Excessive Demands for Services; http://www.allacademic.com/meta/p_mla_apa_research_citation/0/3/1/9/7/p31974_index.html

whose expertise is in U.S. politics and African-American politics, wrote, “Communities that once had their own officers patrolling neighborhoods were now too large and diverse. When neighborhoods couldn't meet their own policing needs for self-protection, law enforcement grew to fill the voids.” As a result, agencies are exploring new alternatives. Geospatial devices or UAV’s *are* amongst those alternatives.

UAV’s

In the United States, the trend for new and innovative means of policing is apparent. In October of 2007, the Department Of Justice Office of Justice Programs National Law Enforcement and Corrections Technology Centers Border Research Technology Center administered a technical bulletin to all law enforcement agencies on the use of unmanned aircraft systems. The purpose of the bulletin was to identify criteria and considerations prior to the purchase and operation of unmanned aircraft systems. Currently, the City of Washington D.C., the Federal Bureau of Investigations, the Drug Enforcement Administration and the Department of Homeland Security are acquiring various types of UAV devices.[9] Documented research proves geo spatial surveillance devices are being investigated by law enforcement not as a temporary solution, but as a permanent more global way of policing.[10]

Why Geo Spatial Imaging?

One might wonder how useful, and for what purposes, using UAV’s in policing might serve. A recent example illuminates the immediate impact such technologies can have:

[9] Interview with UAV-1 creator Mark Bateson, contracted I.T. UAV expert with both Sacramento City Police and Roseville Police Department

[10] Canada.com. Where Perspectives Connect; Britain is becoming Big Brother Society: report

> In May of 2008, woman and children, held captive in the Yearning for Zion Ranch in Southwest Texas. Church members threatened to shoot down any helicopter they saw flying over the compound. The Texas Rangers, in partnership with the FAA and Mission Technologies, flew a UAV over the area, providing law enforcement an "eye in the sky" view of the hostage situation. Several woman and children were removed, unharmed, as law enforcement was able to identify locations and points of entry/exit without being detected. Church members, ready to shoot down a helicopter, were unaware of the UAV flying above them.

When faced with potentially dangerous situations police officers need as much information on the situation as possible before committing to a course of action, as do military personnel.[11] Typically, such information is gathered by SWAT teams, hostage negotiators, field personnel and the community. Positioning field personnel into unknown or high threat situations can expose them to risk and potential death. Currently, organizations may choose to use helicopters or fixed wing aircraft to supply an eye in the sky perspective.[12] Common problems associated with the use of helicopters are availability, limited number of aircraft, the requirement of dedicated pilots, and operational costs. The concept of small, low cost, unmanned, remote, vertical or

[11] Applications for mini VTOL UAV for Law Enforcement; Murphy, Cycon, Space and Naval Warefare Systems Center, San Diego, Sikorsky Aircraft Corporation Introduction
[12] Placer County Sheriffs Department, Falcon 1; Sacramento City Police Department, H-22; CHP Air-1

horizontal take off and landing air vehicle is particularly attractive for these types of applications.[13]

Who is using it now?

Russian police, in the past three years, has substantially increased the number of special purpose air units. "The ministry is to receive the first experimental model of an unmanned rotary-winged aircraft later this year", said Lt. General Mikhail Sukhodolsky.[14] In Europe, they have concluded the use of geospatial devices is necessary in policing. According to the London Independent, "Police believe that the mobile camera units are effective tools against street robbery…" Currently Miami Police Department is working with the FAA to test a small, ducted fan helicopter. All of these efforts are paving the way for use on a much broader scale.

The aircraft are already proven (as they are currently being deployed in Iraq) so it isn't a question of how well the systems perform. Additional testing will determine how the systems will be used in an urban environment and how the data/telemetry systems deal with radio spectrum issues in the United States. In NASA and the office of Customs and Border Protection, unmanned air vehicles are present in nearly every area of the budget, including the requests from several agencies outside the defense realm. The U.S. federal budget request for fiscal 2009 has been presented to Congress and includes funding for unmanned systems of all types as well as the technology that supports them. It is evident

[13] Applications for mini VTOL UAV for Law Enforcement; Murphy, Cycon, Space and Naval Warefare Systems Center, San Diego, Sikorsky Aircraft Corporation Background
[14] Russian News & Information Agency, NOVOSTI; Russian police to get first helicopter drone by year end, 04/22/08

the use of geospatial imaging in law enforcement as a means of policing and tactical deployment is upon us.

Opinions of an Expert Panel

In November of 2007, an expert panel with a diverse area of expertise related to the field of policing, technology and law enforcement/community relationships, convened to discuss the use of geospatial imaging devices as a form of policing.[15] Panelist Michael Murray, a 30 year police veteran, expressed both apprehension and support. He strongly felt there was a need for new resources to fight crime. "If police do not find new and creative tools to assist them in the field of policing, we will eventually fall behind and lose our battle with crime." In his opinion, the use of UAV devices was feasible but was concerned about the acceptance by personnel, ease of use and operational up time.

Art Vogtlin, Manager of a Public Safety Information Technology unit, believed UAV challenges were the knowledge and certification required to support (geospatial devices) and the restrictions placed on the use of the device by the Federal Aviation Administration. Mr. Vogtlin felt costs would decline in the future, thereby making the product more available to law enforcement. "As technology is introduced, costs increase; as old technology is enhanced, costs decline." Ken Van Gundy, an active neighborhood watch board member, firmly believed community acceptance of 'big brother' devices was pivotal to the success of geo spatial policing.

[15] Participating panel members included: a board member of the Roseville Community Outreach Neighborhood Association; a Sergeant with a large metropolitan police agency (Sacramento City Police Department); a Communications Supervisor from Roseville Police Department; an expert in technology, an I.T. Public Safety Manager; a Lieutenant from a rural department (West Sacramento Police Department); a Captain and former member of a law enforcement union board from the Roseville Police Department; and a retired Air Force Colonel.

The panel predicted future events would force antiquated agencies to look to technology to provide policing alternatives. The panel also concluded the use of geospatial imaging devices was beneficial to community, crime prevention, arrest and convictions and quality of life. The panel did note the FAA regulations and permitting processes must first be revised to permit the use of UAV's by law enforcement personnel. Once that hurdle is cleared, it will be up to the energy of local agencies to implement UAV's and geo-spatial imaging in a manner bets suited to the police mission.

Conclusion

What event will push the law enforcement profession towards the utilization of geospatial imaging? It has been suggested another terrorist-related act, a major public crime Prevented by a UAV, war with China, or a natural disaster would all force law enforcement to embrace and implement geo spatial imaging.[16] The increase in funding, improved and tested technology, documented findings supporting geospatial devices and FAA support are all indicators this technology is on the cusp of use for everyday police purposes. The need for law enforcement to become creative to meet the demands of both community and political constituents is mounting. Populations are exacting more from local police agencies. Crime is escalating and quality of life issues are in jeopardy.

It is time to eradicate hurdles, open the minds of those leaders in law enforcement and eliminate apprehension toward new technology. Lives will be saved, crimes will be prevented, arrests and convictions will increase and the quality of life will be enhanced when geospatial imaging devices are actively employed as a form of policing within law

[16] Event Summary Table; Chapter Two, NGT results, Futures Project; Teresa Murray

enforcement. This effective, imaginative, resourceful tool allows those in law enforcement to fulfill their mission, a mission which defines their purpose. How many lives must be lost before law enforcement professionals pursue a proven means of policing our communities?

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