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**WHAT IMPACT WILL PERSONAL POSITION LOCATION
TECHNOLOGY HAVE UPON THE MANAGEMENT
AND ADMINISTRATION OF MID-SIZED LAW ENFORCEMENT
ORGANIZATIONS BY THE YEAR 2000?**

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TECHNICAL REPORT

BY

GEORGE W. BROWN, JR.

COMMAND COLLEGE CLASS XVIII

PEACE OFFICERS STANDARDS AND TRAINING (POST)

SACRAMENTO, CALIFORNIA

JULY 1994

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Abstract

This study examines the impact of personal position location technology on future management and administration of law enforcement organizations. Ten trends will increase in ten years: electronic devices miniaturize through technological development, credibility issues associated with increased computer dependency, sophisticated electronic devices manage prisoners, level of fiscal funding for public agencies, implant technology becomes less evasive, degree to which technology permits organizational "right-sizing", level to which technology permits tracking of Alzheimer's patients, degree to which criminal element keeps pace with technology, degree to which cost of GPS technology drops to the consumer, and organizational dependency on computer technology. Events which would impact the program are: constitutional ruling effects the use of personal position monitoring devices, destruction of the GPS satellite system, 8.0+ earthquake occurs in California, lawsuit by police labor unions, technical advancements make personal position location devices obsolete, unexpected technological development dramatically, reduces cost of GPS/GIS technology, economic failure of government, missing child found due to personal location device, accidental activation of personal position location devices, satellite imaging becomes available to law enforcement. The model strategic plan includes project and policy implementation through the use of a participative management structure. The transition management plan includes the participative management structure and details supporting strategies. Interview data, forecasting results; tables in text; references and bibliography.

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Defining the future differs from analyzing the past because the future has not yet happened. In this project, useful alternatives have been formulated systematically so that the planner can respond to a range of possible future environments.

Managing the future means influencing the future--creating it, constraining it, adapting to it. A futures study points the way.

The views and conclusions expressed in the Command College project are those of the author and are not necessarily those of the Commission on Peace Officer Standards and Training (POST).

Journal Article

What Impact Will Personal Position Location Technology Have Upon The Management and Administration of Mid-Sized Law Enforcement Organizations by the Year 2000?

Author

George W. Brown, Jr.

Introduction

As economic conditions begin to recover from recessionary influences, a general public distrustful of bureaucratic spending is demanding all levels of government maintain service levels with diminished resources. Law enforcement managers are searching for new ideas to assist in, at least, maintaining services. Technology may well offer some answers.

Within the last decade a southern California law enforcement officer was seriously injured during a foot pursuit. Unable to use his portable radio to alert his comrades of his location he ultimately died from his injuries where he lay. This tragedy, and others like it, might have been averted through the use of a personal position location technology.

A personal position location device (PLD) is a instrument which provides highly accurate locational data to a remote site through the interfacing of Global Positioning System satellites and Geographic Information Systems database information. The location of the instrument is then displayed on a computer generated mapping display for a specific geographic area. GPS has proven reliable under certain circumstances to provide locations to within a centimeter¹.

PLD's could have a variety of applications for law enforcement. Strictly as a receiver the instruments could provide highly accurate location data that be use during crime

scene investigations, collision investigations, disaster management, search and rescue, etc.

When designed as a transceiver, the instrument could provide highly accurate locational data that could aid in monitoring a officer during a foot pursuit. The instrument might well serve as a tool used in tracking and locating lost or missing persons. The technology might permit more effective and efficient management of those convicted of crimes while either in prison or after release.

When contemplating the use of such technology the author, being from a mid-sized California rural police agency, framed the central question that arose around a mid-sized department. Due to the fact that technology evolves at such a rapid pace, it seemed prudent to assess the question over a relatively short time frame.

The central question that arises is: What impact will personal position location technology have upon the management and administration of mid-sized law enforcement organizations by the year 2000?

In examining the central issue it became apparent that in order for PLD technology to effectively aid law enforcement impact of miniaturization would have to be assessed against the future of the technology. Additionally, certain applications of the technology would likely evoke a response from the legal community as to the constitutionality of the application. Finally, the reactions of law enforcement labor unions must be anticipated if officers were equipped with PLD's.

In attempt to answer these key questions the author conducted a literature search to determine what formal information was already available. Information is available

regrading GPS and GIS separately and interfaced. The results of the literature search were limited as applied to law enforcement.

The majority of the information obtained during research of the issue and sub-issues was obtained by virtue of personal interviews with technicians, research and development personnel or marketing specialists associated with GPS receivers and search and recovery beacons.

Technical experts and marketing specialists supported the belief that continued miniaturization would have a significantly positive effect on personal position location technology. Those offering consultation were:

David Sprague, Product Manager, Trimble Navigation, Sunnyvale, CA
William O. Dussell, Marketing, Trimble Navigation, Sunnyvale, CA
Fred Mintz, Member of Technical Staff, Jet Propulsion Laboratory, Pasadena, CA
Al Coppin, Emergency Products Manager, MPR TelTec, Burnaby, BC

The source for anticipated law enforcement labor union reaction to officers being equipped with PLD's involved the perception that the devices could be used against them by their supervisors. The experts related that by making the use of the devices voluntary any threat of supervisorial impropriety could be eliminated.

Future of the Issue

The author employed a panel process in an attempt to brainstorm trends and events that might impact the issue and sub-issues over a ten year period. The panel was composed of professionals from business and law enforcement.

The panel recognized ten trends which could impact the issue. The most relevant are provided for review:

* Electronic Devices Miniaturize Through Technological Development

The panel felt that the trend of miniaturization would continue PLD's and have a positive impact on the technology.

* Level of Fiscal Resources for the Funding of Public Agencies

The panel recognized that the funding of public agencies had declined significantly over the past five years. The panel felt this condition would continue and in fact become even more acute before it got better. Collectively there was agreement that this one trend would be the catalyst that causes the greatest change in how law enforcement conducts business.

* Degree to Which Technology Permits Organizational "Right-Sizing"

The members of the panel felt that technology, regardless of its discipline, could be the single greatest influence permitting the maintenance of service levels in the face of "right-sizing". Panelists forecast this trend would develop equally at a five and ten year mark.

* Degree to Which Cost of GPS Technology Drops to the Consumer

The panel recognized the historical fact that as prices drop to the consumer for a technology the more in demand it becomes. The greater the demand the more the price reduces. Panelists applied this logic to GPS technology and determined a positive effect. Over a ten year period panelists predicted a steady development of this trend.

* Organizational Dependency on Computer Technology

Panel members sensed that public and private organizations have become highly dependent upon computer technology as tools of business. They felt this trend would continue and heighten. The greatest impact will be felt over the next five years.

* Credibility Issues Associated With Increased Computer Dependency

For as much as computer related technology has assisted government and business it hasn't been without expense. In certain cases the cost has been credibility. The panel felt there should be vigilance to guard against the potential rise of such issues. The panel felt this trend would not gain much significance during the next five years. They predicted its significance would become more of an issue at the end of ten years.

The panel then predicted ten events which, if they occurred, would impact the issue positively or negatively. Additionally, the panel forecast events probability and time line. A sampling follows:

* Constitutional Ruling Effects the Use of Personal Position Monitoring Devices

There was significant agreement that there would be a major court decision effecting the use of position monitoring devices within the next five years. Most panel members felt the ruling would restrict the use of the devices.

* Lawsuit by Police Labor Unions

As with the court ruling the panel recognized the potential for adverse action by a law enforcement labor union within the next five years. This event was given a very high probability of occurrence. However, panel members felt a confrontation might be avoided through device design and cautious crafting of procedural guidelines.

* Satellite Imaging Technology Becomes Available to Law Enforcement

The panel recognized the potential of satellite imaging being a useful tool to law enforcement in certain applications. The panel felt this event had a slight probability of occurrence within the next four years and a much stronger likelihood by the end of ten years. The panel did not feel satellite imaging would serve as a replacement for PLD technology due to a variety of perceived circumstances.

Based on the ten selected trends and events a futures scenario was developed that offered a most attainable and realistic theme. The scenario is presented from a historical perspective. The following is a synopsis:

Based on a continued decline of fiscal resources during the 1990's public safety managers were forced to examine alternative methods of providing services. Several local governments were on the brink of economic failure, but all survived.

Public safety managers and administrators looked toward technology as a means of offering some advantages that would permit maintenance of service levels. In many respects technology permitted the opportunity to "right-size".

Continued price reductions made personal position location technology cost effective. It offered certain job task benefits as well.

Modification of the PLD's to provide manual activation as opposed to the devices constantly monitoring averts a lawsuit.

The aftermath of a 8.0+ magnitude earthquake saw the speedy rescue for many victims due to PLD's.

High resolution satellite imaging did eventually become available to law enforcement. However the expense associated with use made it cost prohibitive except for the most extreme situations. Spontaneous target acquisition posed certain problems as well.

During the late 1990's a war erupted in the middle east between a Third World country and a US ally. The GPS system was degraded to both sides after threats to destroy the system coupled with the ability to destroy the system were realized.

The US Supreme Court consented to review the constitutionality of using PLD's on non-custodial and unsentenced prisoners in January, 1999.

Notable success was achieved in the management of Alzheimer's patients through the use of PLD's.

Strategic Implementation Plan

This section develops an PLD use implementation plan for the South Lake Tahoe Police Department. South Lake Tahoe is a rural alpine community whose primary industry is tourism. The resident population is approximately 22,000. The transient population can reach 250,000 a day. The Police Department is staffed by a complement of 70, 52 of which are sworn.

Mission Statement

The mission statement comes in two forms: macro and micro. The macro mission statement reflects the organizational statement to the community and those employed by the department. The micro mission statement is specifically tailored to the issue.

Macro - We, the members of the South Lake Tahoe Police Department, in order to ensure the highest level of service to our community, to live to the highest standards of ethics that reflect the dignity of our noble calling, to establish a high quality of work life for those who have committed their lives to the safety and well-being of our fellowman, do hereby pledge ourselves to the following:

We recognize that our primary mission and highest priority is to serve our community in the most professional, courteous and efficient manner possible. To that end we will always strive to nurture a partnership between the Police Department, the City Family and the Community based on trust and respect. Knowing that our Community is

evolving and rich in cultural and ethnic diversity we will continually reach out and seek its needs and concerns. In doing so we will honor and preserve the rights of every citizen and colleague embracing the principal or respect for differences in race, creed, style and personal opinion.

In order to be successful in our mission, each of us acknowledges his or her worth as an important part of the whole and thereby accepts all the rights and responsibilities in a position of trust within the community. As an ongoing process, we will strive to improve ourselves, the Department and the Community. We view our Department as a living, growing enterprise and will remain flexible to positive change. We will strive to exceed the highest ethical standards of our profession and be steadfast in our commitment of duty.

Micro - It will be our goal to commit ourselves to provide levels of service which will meet the expressed and implied needs of the community we serve. Being mindful of the diminishing resources available to public safety organizations it is incumbent upon each member of the department to search for techniques and explore opportunities that may encourage maintenance of services while remaining fiscally responsible.

To that end we believe there is benefit in certain technologies that may enhance our abilities to meet our goals. Our purpose will be to examine these technologies to determine their anticipated benefit and, if found beneficial and fiscally responsible, adopt the considered application.

In as much as change is easy for some and more difficult for others, we will strive to develop consensus supporting any technology or process to be introduced into our organization. We will develop transitional strategies which offer consideration to all we serve and employ.

Environmental Analysis

In order to adequately prepare an implementation plan an environmental analysis of the organization should be completed to assess the potential opportunities and threats to the issue must be assessed.

An opportunity is any favorable situation in the organizations environment that supports the demand for a product or service and permits the firm to enhance its position.

- * Electronic devices tend to miniaturize and present diverse marketing appeal as manufacturing expense is reduced through technological advances.

- * Diminishing fiscal resources for the funding of public agencies will cause administrators to find creative new methods of offering services in the face of reduced staffing.
- * Public and private organizations develop an increased dependence on computer technology and those technologies that evolve from computers.
- * The present atmosphere of developing partnerships toward prevention and solving community based problems creates a natural vehicle which encourages the development of technology to aid in the solving of problems.

Threats are unfavorable circumstances, conditions or situations within an organization. As related to the issue threats may be conditions which prevent or hinder implementation.

- * Perception that position location technology infringes on civil rights leads to constitutional challenges which would restrict use.
- * Electronic technology paranoia.
- * Police labor unions react adversely to the opportunity of their members movements to be monitored.
- * Technical advancements make personal position location technology obsolete.

Organizational Analysis

The organizational capabilities of the organization to achieve its mission must be assessed as well. In order to do so specific strengths and weakness relative to the issue must be identified.

Strengths are simply resources that might be used by an organization to reach its goals.

- * Law enforcement is skilled at creatively adapting technology to uniquely aid in the law enforcement mission.
- * California law enforcement is resourceful, well trained and well equipped.
- * California law enforcement is willing to follow the successful practices established in the private sector that have value in the public sector.
- * California law enforcement is adopting a more analytical approach to change which makes change less traumatic.

Weaknesses are obstacles or faults which might prevent the organization from achieving its goals.

- * The continued decline of the economy forces staffing reductions and lessens ability to purchase and maintain equipment.
- * Goals and objectives of the technology not being clearly expressed could likely lead to paranoia amongst personnel.

Stakeholders

Stakeholders are organizations, groups or individuals who either impact what you do; are impacted by what you do; or are concerned about what you do.² Additionally, assumptions regarding each stakeholder will be identified.

Police Officers: The line personnel may not support the technology if the actual expense of adaptation impacts their ability to negotiate a salary increase. They will likely support the technology if they can perceive a benefit to them in the form of work effort reduction. Under no circumstances will they support the technology if they feel threatened.

Police Middle Management: Middle management will support the technology if there is a sense of cost effectiveness related to its use. Likewise they will be supportive if

there is a demonstrated ability to provide a safer work environment. They will compare the technology against other attractive or practical offerings.

Chief of Police:

Fiscal, organizational and safety considerations will be of concern to the Chief. The Chief will support the technology if it has a broad base of support throughout the department. Cost effectiveness will be an issue.

City Manager: The manager will be supportive if cost effectiveness can be demonstrated. He would prefer a technology that has a broad base of appeal to other city departments. Technical versatility will be an issue.

Strategy Development

Through panel discussion several alternative implementation strategies were examined. One strategy involved implementation via unilateral means. There was not attempt at consensus building.

The second plan involved taking a passive role and let others pave the way. Like the first plan, the second made no provision for consensus building.

The strategic plan selected involved a complete review of the planned change by the departments Participative Management Team (PMT). PMT, which meets monthly, is composed of department representatives from every facet of the department. Organized in 1991, the group meets to review and develop consensus on short and long term goals and hammer out policy.

PMT, which is made up of many of the stakeholder groups, would likely empower a subcommittee to guide implementation of the technology. This approach allows for ownership and consensus building from the very beginning of the project.

Implementation Plan

The following steps should be taken:

1. Introduction to and examination of the proposed change by PMT. Establishment of a subcommittee
2. Education of subcommittee members regarding the technology.
3. Establish specifications for bid process and publish requests for proposals.
4. Establish policy considerations and guidelines.
5. Be vigilant of stakeholders and troubleshoot when necessary.
6. Site preparation and installation.
7. Training.
8. Post implementation troubleshooting and planning for the future.
9. Utilization of the media to promote progress and completion of project.

Transition Management

Key to implementing the specified change is to effectively manage the change during the transition from what the organization is to what it will be. In the particular case of this study implementation and transition will be managed through the PMT subcommittee. However, in order to be effective, the transition phase must consider the level of readiness of each stakeholder and what level of commitment is necessary for the project to proceed to completion.

The minimum number of individuals or groups, originating from the identified stakeholders, who must support the project in order for it to succeed are the "critical mass".

The Police Officer's Association (POA) will be one of the key elements in allowing change to occur. The POA can block change if it desires. Issues with the POA will likely be: the ability to surreptitiously monitor activities, and funding spent on technology as opposed to salary.

The City Manager is a change maker who has espoused the benefits of technology. The City Manager has made it clear technology may well be the way around further budget cutbacks. The manager is a change agent.

The Police middle managers are interested in the welfare of their personnel. They are interested in effective and efficient service to the community. Enthusiastic interest from the mid-managers could be influential with the remainder of the department.

The Chief of Police is aggressively pursuing ways of fortifying the department in the face of diminishing fiscal resources. He sees value in technology. The Chiefs leadership and support of the project would influence a broad segment of the department and community.

Management Structure

The management structure established in the department (PMT) will be the mechanism that sees the project to completion. However, a project of this magnitude should have a project manager.

Supporting Mechanisms

In order to manage change effectively requires varied types of techniques and mechanisms in problem solving. Some of the following systems are inherent to PMT and others will need to be introduced.

1. Communication: Frequent and descriptive updates will serve to keep personnel informed and reduce anxiety.
2. Involving Others: By involving others in the project there is a sense of shared ownership that develops which in turn develops into a sense of commitment to the project.
3. Accessibility: Personnel look for reassurance during periods of change. The project manager should be available to all.
4. Limit Other Major Changes: The effects of one major change can be organizationally draining. Consequently, care should be taken not to compound the effects of one major change with another at the same time.
5. Recognition: Giving recognition inspires commitment.
6. Responsibility Charting: Responsibility fixes responsibilities for certain tasks. It is a road map of sorts for who has responsibility and their level of responsibility.
7. Phase Completion Reports: A report process that allows for critical review of each phase of the project as completed. These reports are tools to be used to assess the effectiveness of the implementation plan.

Conclusion and Recommendation

The foregoing analysis provides the following conclusions to the sub-issues:

- * What impact will miniaturization have on the future of personal position location transceivers?

Research conducted serves to verify that as electronic devices miniaturize they become more marketable, convenient and popular. This marketability serves to reduce prices which tends to have a further positive influence on the device.

- * What impact will court decisions have on the use of personal location devices?

Clearly the judicial system could impact the use of PLD's. The study validates the fact that a thoughtful approach to design and implementation strategies would go a long way in preventing judicial involvement.

It is impractical to attempt to obtain judicial opinion on the use of PLD's, as judicial decisions are based on presented situational evidence. It would be impossible to hypothesize in the abstract.

- * What reaction can be anticipated from law enforcement labor unions if officers are equipped with personal position location transceivers?

The study supports the contention that labor unions will take exception to having their routine activities monitored by an electronic device. This sub-issue can effectively be mitigated by simply designing the transceiver portion of the device to be manually activated with an on/off switch.

The issue question:

- * What impact will personal position location technology have upon the management and administration of mid-sized law enforcement organizations by the year 2000?

Through the use of interviews and review of literature it becomes apparent that if law enforcement administrators have the opportunity to employ the use of personal position location technology there are areas of concern.

The primary area to be addressed is in the arena of employer-employee relations. Care should be taken to develop consensus of purpose and understanding of the technology.

Administrators will find it advantageous to involve all facets of the department impacted in the technology in the determination to use the technology. A team approach would prove beneficial.

Ongoing budget concerns will effect service levels and methods of service delivery for the entire decade of the 1990's.

Recommendation

Law enforcement leaders cannot control the external forces that play upon their abilities to carry out the mission of law enforcement. They must be aware of these conditions and harness them to their advantage where possible. Through awareness and knowledge administrators can harness the benefits of personal position location technology for the efficiency and safety of their personnel.

-
1. Jeff Hern. GPS. A Guide to the Next Utility, Trimble Navigation, 1989, p. 7.
 2. Richard Lyles. From lecture and handout, "Stakeholder Analysis and Strategic Asumption", July, 1993, San Marcos, CA.

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SECTION I

INTRODUCTION

Background to the Issue

A law enforcement officer charges from his patrol vehicle in foot pursuit of a subject. After an exhaustive chase the officer believes he has the subject contained in an alley. As the officer enters the alley he is ambushed by the subject. Unable to use his portable radio he is unable to direct responding units to his location. The officer is at the mercy of the subject or, if injured, his life might depend on the prompt arrival of medical aid. How does the officer get help?

A young child is lost in a heavily wooded mountainous area after having strayed from a campsite. Being unfamiliar with the area and having lost sense of direction, will the child be located before succumbing to the elements or a wild animal?

An Alzheimer's patient wanders away from a care facility or private residence launching a search operation by one or more law enforcement agencies. Is there a device that might aid in locating the stricken person?

The answer might well be in the form of personal position location devices (PLD). These instruments would not only pinpoint an individual's location for the person in possession of the device to know, but would also allow a second party, at a monitoring location, to know the location of the lost or missing individual in possession of the PLD.

Over the past three decades the United States Department of Defense has launched a constellation of 24 satellites, known as the Global Positioning System (GPS). One might think of the satellites as man-made stars.¹ Each satellite transmits a signal to

earth based receivers at precise intervals. The GPS receiver then translates the signal to the longitude, latitude and altitude of any point on earth.²

The greater the number of GPS satellite signals available to the receiver, combined with the receivers' ability to receive a multiple signals, the more accurate the calculation of the receiver's location. Manufacturers report users are obtaining measurement accuracies better than the width of an average street. Under certain conditions using sophisticated, yet affordable accessories, surveyors are making measurements down to a centimeter.³

When GPS was first introduced commercially for public use, receivers were bulky and expensive enough to cause their market to be limited. Design modification allowed the receivers to become more compact. As the receivers became more compact they became more marketable. As the units developed a bigger market share GPS receivers became more affordable and uses for the technology diversified. GPS receivers are presently being used to navigate boats, planes, spacecraft and vehicles. The technology was used extensively during the Persian Gulf War.⁴

While GPS was securing its place in the world of technology, a computer database mapping technology was developing into a reliable resource for users in both the public and private sectors. This new development, the Geographic Information System (GIS) is a computer-based mapping system that allows a bird's eye view of geographic areas based on data which had previously been entered into the computer.

Much of the reliable mapping data available to date has been accumulated from United States Geological Survey quadrangle maps, summaries of census data and satellite imagery from various NASA programs.⁵ Much of the data that existed initially was

generated from government sponsored programs and was classified, but with the demise of the Cold War much of the intelligence data involving GIS is now being released to the public. Private companies have reprocessed and enhanced the data for resale to the public and private sector.

GIS data has proven useful in local government applications in the form of resource management, planning, environmental conservation, mapping and emergency response.

When integrated with a transmitter, GPS and GIS offer the combined impact of being able to track an object, to date usually a vehicle, as it travels throughout a geographic area in real time. The raw positioning data available through GPS is transmitted through a wireless network to a central computer station. Software then converts the latitude and longitude into a dot on the GIS screen. The dot represents the precise geographical location for the object.⁶ This technology is assisting a variety of mobile operations to operate more effectively and efficiently.

Presently, several commercial firms offer vehicle fleet management systems that have proven useful in tracking vehicle fleets. The automated vehicle location systems (AVL) offer the ability to track vehicles in real time. Other firms have produced similar devices which have proven successful in tracking stolen vehicles, i.e. Lo-Jack. The Lo-Jack system permits the tracking of vehicles equipped with specialized radio transmitters by triangulating on the transmitted frequency.

The technology to track an object in real time exists today. The question that arises is: Will this technology be miniaturized to effectively offer more diverse uses?. In other words, will the technology presently available to vehicle fleet management be

miniaturized to the extent that small, personal position location devices, become available for everyday use in certain applications?

When adaptable to the various missions of law enforcement, technology has long been an aid to law enforcement operations. Law enforcement administrators have turned to various forms of technology and automation to fortify operations for various purposes.

In each of the brief scenarios described at the beginning of this section a personal position location device capable of transmitting the location of individual would have benefited the characters described in the scenario. The injured law enforcement officer would benefit from the timely arrival of support units. The missing child would be located and, hopefully, rescued before being injured. The Alzheimer's patient could be swiftly located, thus minimizing search expense to the law enforcement agency. Of course an alternative activation method would have to be designed that would cause the device to activate automatically, as there would be no assurance the Alzheimer's patient would be cognizant of the need to activate the device.

Today, as economic conditions are beginning to recover from recessionary influences and a general public, distrustful of bureaucratic spending, is demanding all levels of government maintain service levels with fewer resources, law enforcement managers are searching for new ideas to assist in, at least, maintaining services. Technology may well offer an answer. Personal position location devices may serve as but one facet of the technological element available to law enforcement managers to aid in service delivery and protection of personnel.

In an attempt to obtain focus and clarity on the present status and potential future of personal position location technology the author conducted interviews with four experts

in the area of hand held GPS technology and a fifth interview with an expert in the area of radio telemetry. These interviews were conducted to add clarity and insight to topical literature on the subjects of GPS, GIS and AVL. The author noted that literary support of the topic was limited as the integration of GPS and GIS resulting in position location technology is relatively new and constantly evolving. Literature is limited to mainly promotional and marketing information and journal articles.

The following were interviewed:

David Sprague
Trimble Navigation
Product Manager
645 North Mary Ave.
Sunnyvale, CA 94088-9567

William O. Dussell
Trimble Navigation
Marketing
645 North Mary Ave.
Sunnyvale, CA 94088-9567

Fred Mintz
Jet Propulsion Laboratory
Member of Technical Staff
4800 Oak Grove Dr., 510-264
Pasadena, CA 91109

Al Coppin
MPR TelTec Limited
899 Nelson Way
Burnaby, VC V5A4B5

The experts agreed that the concept of developing the AVL type system(s) into a more compact model would be viable for personal use, providing a market existed for the end product. The manufacturing representatives admitted that the law enforcement market is a viable one and there is great sensitivity to the needs of law enforcement. The

experts acknowledged GPS application in its present form offers precise locating capabilities at crime and collision scenes.

In addressing miniaturization, Mr. Dussell explained that researchers were presently working on GPS receivers which would integrate with clip board type computers. Mr. Dussell felt confident the cost of GPS technology would reduce as use expanded.

Each of the experts expressed concern over the effects of "urban valleys" that exist in metropolitan areas. Urban valley conditions are created due to clusters of high rise building complexes. Occasionally, radio signals are attenuated or blocked in these urban valleys. Such conditions could seriously impair the ability of a receiver to receive signals from a satellite and/or transmit the signal to a dispatch center. However, this situation could be countered through the strategic placement of repeater sites that would strengthen and relay the transmitted signal to a dispatch center.

There is a strong likelihood that law enforcement labor unions would object to constant monitoring of patrol and support personnel. Many mobile data terminals that are placed in police service vehicles have built in AVL devices. Objections from labor unions have caused the AVL devices to be deactivated. Mr. Dussell cited at least one example that prompted deactivation of AVL's integrated with mobile data terminals.

Since the device being examined in this study is virtually identical to the AVL type devices, a similar tracking capability should be anticipated. The author contacted Mr. Mintz to determine if there was a type of biofeedback type trigger that might activate a personal location device from a standby status to a transmit status when a adrenal influence was detected in a person's body chemistry. Mr. Mintz indicated that there was nothing to his knowledge available that was non-intrusive that could sense the presence

of adrenaline. Obviously, there are a variety of conditions that could stimulate adrenal glands, not limited to fight or flight reflexes.

Mr. Mintz indicated that research work was presently being conducted with drug sensing patches that sampled metabolites for the presence of certain specific drugs in a person's system. The information obtained via the patch would be quantified and, through radio telemetry, transmitted to a receiving station elsewhere. However, this research is directly applicable to the detection of dangerous drug or narcotic use, not bodily fluids.

Mintz suggested that in order to reduce privacy issues and objections from labor unions, the best activation mechanism would be a simple on/off switch. Departmental guidelines might be developed that controlled conditions under which the transmitter should be activated.

Interviews and a literature search revealed the fact that a few firms are marketing devices that, when activated, transmit a message to a satellite which details, in latitude and longitude, the location of the device. However, there are only four satellites available to relay the information to a single earth-based communications center. The communications center is controlled by the firm that markets the devices. When a distress message is detected, communications center staff alert the appropriate response agency whether it be a land or water based distress. While the service offered by the company is identical in practice to the author's proposed application, a quicker response would be available if the data was received directly by a law enforcement agency.

In an informal sampling of line officers within the author's department it was learned, that while there was interest in the benefit of such a tracking device, there were concerns regarding privacy issues relating to the department using tracking devices to monitor officers' activities. When the author explained activation of the personal position location device would be accomplished by simply including a on/off switch concerns were mitigated.

Issue and Sub-issue Development

Based on the preceding the following question arose:

What impact will personal position location technology have upon the management and administration of mid-sized law enforcement organizations by the year 2000?

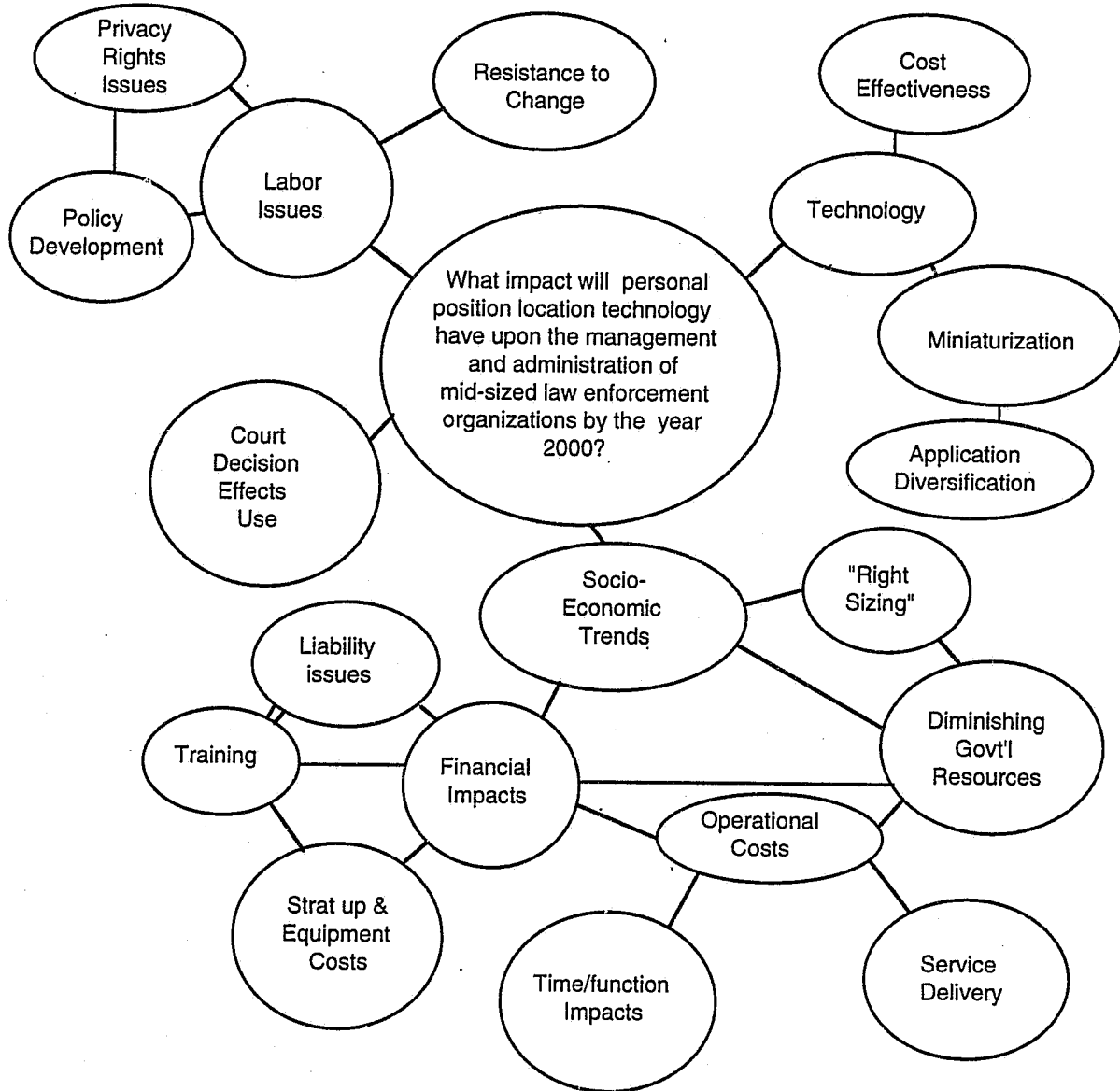
In the process of attempting to assess the impacts of personal position devices on law enforcement several sub-issues arose that could influence the use of the devices. The sub-issues were determined based on the preceding interviews.

1. What impact will miniaturization have on the future of personal position location transceivers?
2. What impact will court decisions have on the use of personal position location devices?
3. What reactions can be anticipated from law enforcement labor unions if officers are equipped with personal position location devices?

Futures Wheel

In an attempt to further analyze the issue a Futures Wheel (Illustration 1) was composed. The use of the Futures Wheel is employed to offer the reader a graphic medium with which to view the relatedness of the issue and sub-issues. Surrounding the main issue at the center of the Futures Wheel are the sub-issues.

**FUTURES WHEEL
ILLUSTRATION 1**



In June, 1992 the author conducted a formal survey among ten colleagues, from the South Lake Tahoe Police Department, soliciting issues, not related to the issue

question, each felt would confront the law enforcement administrator over the next ten years. Those participating in the survey were:

Les Scott, Sergeant	Bob Mabee, Sergeant
Richard McGuffin, Sergeant	Rick Canale, Sergeant
Michael Ritter, Sergeant	Richard Munk, Sergeant
Tom Conner, Sergeant	Brad Bennett, Sergeant
Arthur Ritter, Lieutenant	Bart Owens, Lieutenant

A consistent theme throughout each response involved the fact that meeting challenging and changing social conditions with limited resources will necessarily cause the law enforcement administrator of the future to conduct business differently. Technology and automation will play a role in this work redesign effort. Devices such as personal position location devices that can accurately pinpoint a person's location may be one of the tools considered to offer more effective and efficient service delivery while providing a safer environment of the peace officer of the future.

Scope and Limits of the Study

The report that follows will summarize the methodology and findings of the futures study. The primary focus of this study is on a mid-sized California law enforcement agency, specifically the South Lake Tahoe Police Department. It must be noted that the social and economic conditions faced within the state are also mirrored throughout the country. Therefore, local, regional and, on a limited basis, international sources offered information pertinent to the study.

Methodology and Presentation

The study that follows will be presented in three sections.

Section II contains a futures study that will be used to develop 10 trends and 10 future events that could impact the issue. Each trend and event will be analyzed and will be used as a starting point for the development of future scenarios.

Section III will develop a strategic management plan to be used as a guide as the agency moves toward adopting and implementing personal position location technology. The plan will employ the STEEP and WOTS UP processes to analyze the plan. Stakeholders will be identified and analyzed. Finally, a implementation plan will be detailed to manage the recommended strategy.

Section IV will conclude the study with a transition management plan designed to provide orderly implementation of the program. This final phase will prepare administrative and line staff for the transition to and implementation of personal position location technology.

SECTION II

FORECASTING THE FUTURE

Throughout this section the issue and sub-issues will be examined. Based on the examination a list of trends and events will be identified and developed relevant to the issue. Ten trends and events will be selected, forecasted and examined through a panel process. Using the trends and events as a foundation three futures scenarios will be presented. One scenario will serve as the theater for the future.

The Issue:

What impact will personal position location technology have upon the management and administration of mid-sized law enforcement organizations by the year 2000?

The Sub-Issues:

1. What impact will miniaturization have on the future of personal position location transceivers?
2. What impact will court decisions have on the use of personal position location devices?
3. What reactions can be anticipated from law enforcement labor unions if officers are equipped with personal position location devices?

The sub-issues were determined through consultation with experts from the technical field and with the assistance of a survey of law enforcement supervisors and administrators from the South Lake Tahoe Police Department conducted in June, 1992.

Nominal Group Technique Trend and Event Identification and Evaluation

In order to fully examine trends and events which might tend to impact the issue and sub-issues a panel was assembled to participate in a Nominal Group Technique (NGT) exercise. The Nominal Group Technique (NGT) is a small-group technique for

achieving acceptable consensus on the answer to a single, usually two-part, question by a process that alternates private work and open discussion.⁷

The panel consisted of eight professional persons from the immediate area, with particular attention devoted toward gathering people with diverse occupations and backgrounds. The members of the NGT were:

- * Guy Lease, Ph.D., President, Lake Tahoe Community College
- * David A. Solaro, Chief of Police, South Lake Tahoe Police Department
- * Manny Morgado, Vice President/Manager, Bank of America
- * Pam Sullivan, Law Enforcement Technician, South Lake Tahoe Police Department
- * Tom Davis, Lodging business executive/City Councilman
- * Bill Frye, Data Processing Systems Analyst, City of South Lake Tahoe
- * Lou Long, Deputy Sheriff, El Dorado County Sheriff's Office

Preparatory to the task of developing lists of candidate trends and events (Attachments A & B respectively), panel members were informed and offered background to the issue and sub-issue questions to be examined. Additionally, they were provided guidance in the NGT process.

Trends Selected for Forecasting

Upon generation of the list of candidate trends the NGT panel independently voted for the trends each felt were most relative to the study. The ten trends selected by the Panel and their rank order are:

- * T-1 Electronic devices miniaturize through technological development.
- * T-2 Credibility issues associated with increased computer dependency.
- * T-3 Sophisticated electronic devices manage prisoners.
- * T-4 Level of fiscal resources for the funding of public agencies.
- * T-5 Implant technology becomes less evasive.
- * T-6 Degree to which technology permits organizational "right-sizing".
- * T-7 Level to which technology allows tracking of Alzheimer's patients.
- * T-8 Degree to which criminal element keeps pace with technology.
- * T-9 Degree to which cost of GPS technology drops to the consumer.
- * T-10 Organizational dependency on computer technology.

Events Selected for Forecasting

The panel identified the following events as being most likely to impact the study:

- * E-1 Constitutional ruling effects the use of personal position monitoring devices.
- * E-2 Destruction of GPS satellite system.
- * E-3 8.0+ magnitude earthquake occurs in California.
- * E-4 Lawsuit by police labor unions.
- * E-5 A technological advancement makes personal position location devices obsolete.
- * E-6 Unexpected technological development dramatically reduces cost of GPS/GIS technology.
- * E-7 Economic failure of government.
- * E-8 Missing child found due to personal position location device.
- * E-9 Accidental activation of personal position location devices.
- * E-10. Satellite imaging technology becomes available to law enforcement.

Trend Forecasting

Panel members were ask to estimate the level of each trend using a trend evaluation form (Illustration 2). Using the present date (1993) as an arbitrary ranking of 100, panel members were asked to provide a value to each trend five years ago, five years and ten years into the future.

The Trend Evaluation Form (Illustration 2, page 15) depicts the mean levels computed as a result of the panel's input.

ILLUSTRATION 2
TREND EVALUATION FORM

TREND STATEMENT	LEVEL OF THE TREND (Today = 100)			
	5 Years Ago	1993	5 Years From Now	Ten Years From Now
T-1 Electronic Devices Miniaturize Through Electronic Development	68.6	100	128.6	154.2
T-2 Credibility Issues Associated with Increased Computer Dependency	67.1	100	114.3	140.7
T-3 Sophisticated Electronic Devices Manage Prisoners	75.0	100	128.6	147.9
T-4 Level of Fiscal Resources of Funding of Public Agencies	75.0	100	128.5	147.9
T-5 Implant Technology Becomes Less Evasive	98.4	100	113.4	138.0
T-6 Degree to Which Technology Permits Organizational "Right-Sizing"	87.8	100	127.1	149.2
T-7 Level to Which Technology Allows Tracking of Alzheimer's Patients	86.1	100	126.4	161.4
T-8 Degree to Which Criminal Element Keeps Pace With Technology	92.1	100	112.9	127.9
T-9 Degree to Which Cost of GPS Technology Drops to the Consumer	81.9	100	129.3	155.7
T-10 Level of Organizational Dependency on Computer Technology	80.7	100	127.9	150.0

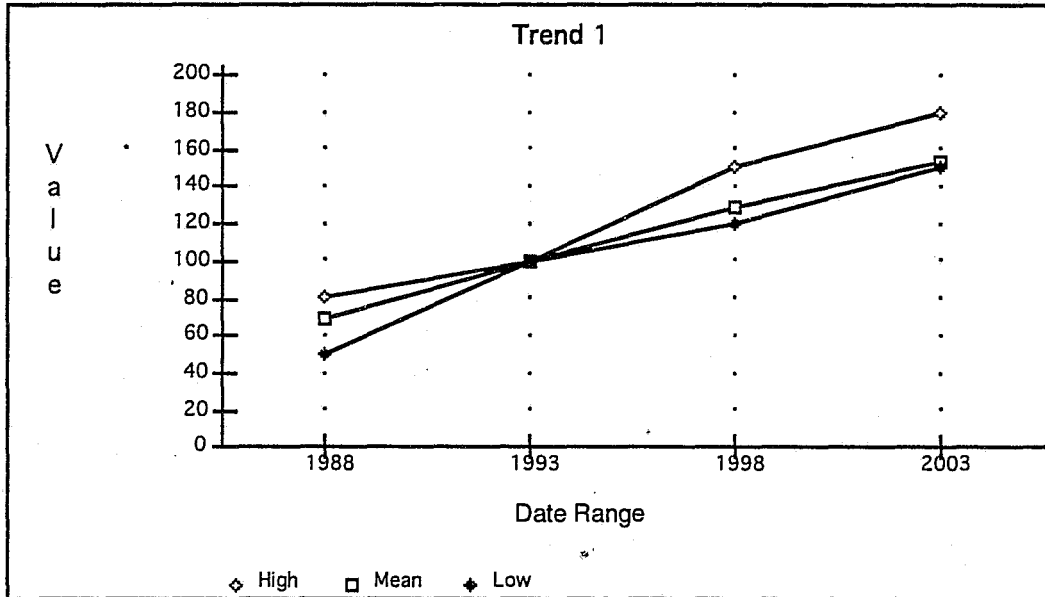
Trend Graphs and Analysis

While the foregoing Trend Evaluation Form depicts the mean results of the panels effort the graphs that follow will provide a visual illustration of the panels highs and lows related to each trend. The mean is the result of a combination of the panels work. Panel members were equally distributed in their rankings making use of the mean feasible. Additionally, a brief description of each trend is provided, along with the panels analysis of the trend.

Trend 1:

Electronic Devices Miniaturize Through Technological Development.

ILLUSTRATION 3



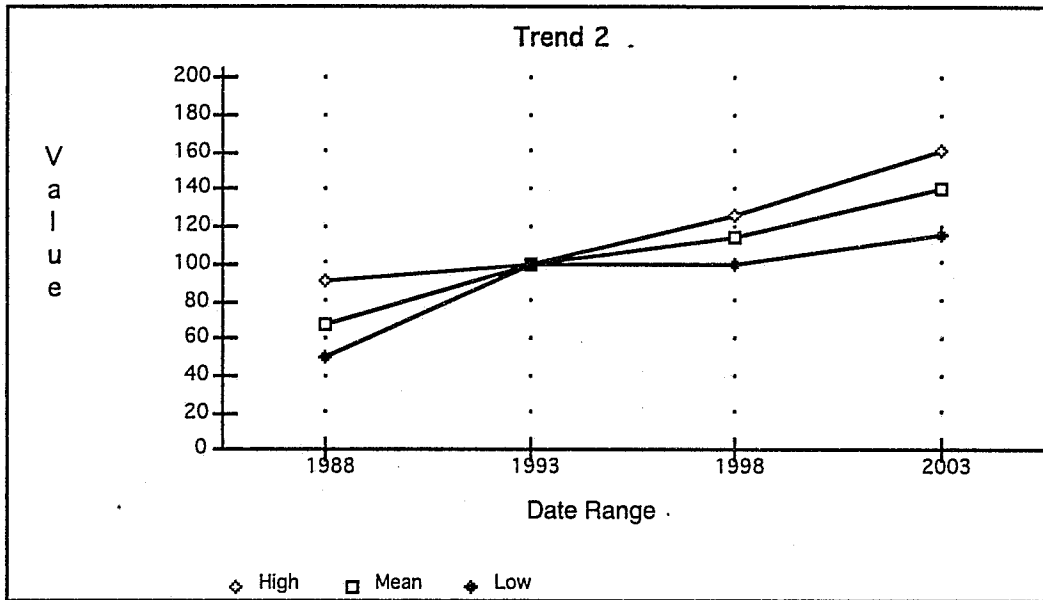
The graph representing the results of the panels forecast on Trend 1 suggests that the panel felt the miniaturization of electronic devices was a general certainty. In discussions the panel felt the same evolutionary principles of miniaturization have occurred and will continue for GPS related devices as did with the personal computer. In reviewing the forecasts of the panel members their consensus seemed to indicate a steady continued evolution toward smaller more compact devices.

Once bulky and not transportable GPS devices have steadily gotten smaller and much transportable. Panel members felt this trend would continue.

Trend 2:

Increased Reliance Upon Computer Technology Develop Agency Credibility Issues.

ILLUSTRATION 4



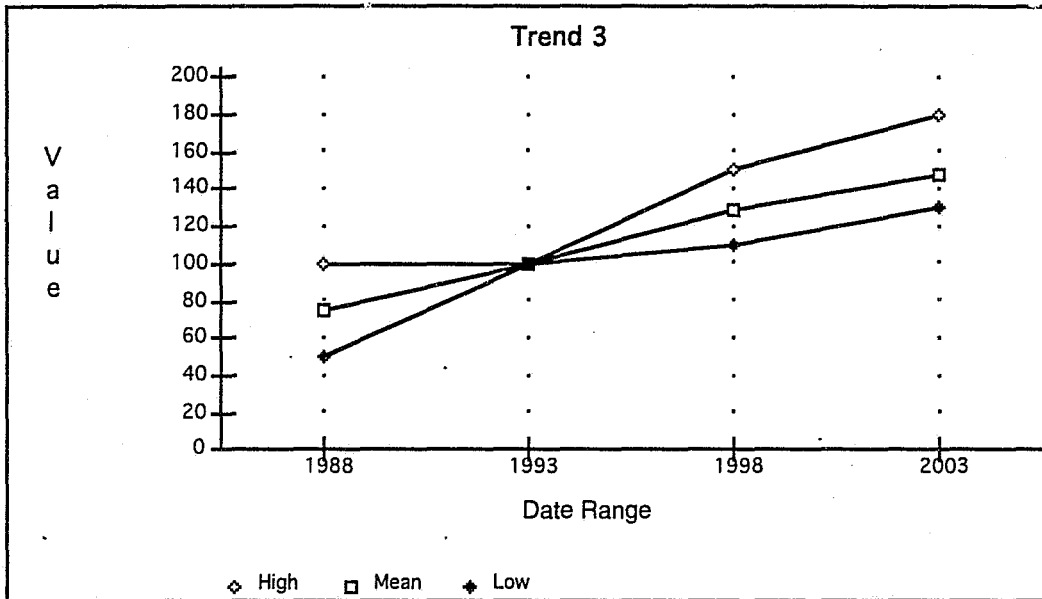
The graph evolving from Trend 2 suggests panelists felt that between 1988 and 1993 there was an element of suspicion of credibility regarding public and private agency use of computer technology. While the concerns exist in the future, the air of suspicion is somewhat mitigated during the first five years and increases between the five and ten year period.

Panel discussions explained the comparatively significant increase between the five and ten year period in that the panel felt they had a grasp on the potential of technological advancement over the next five year period. However, after that time frame, the potential for design and theoretical advancement might well exceed their comprehension. The consensus of the panel was that once interest in a particular item or device is developed design modification effort devoted toward making the device more appealing might be best explained by taking the equation to the tenth power cubed.

Trend 3:

Sophisticated Electronic Devices manage Prisoners.

ILLUSTRATION 5

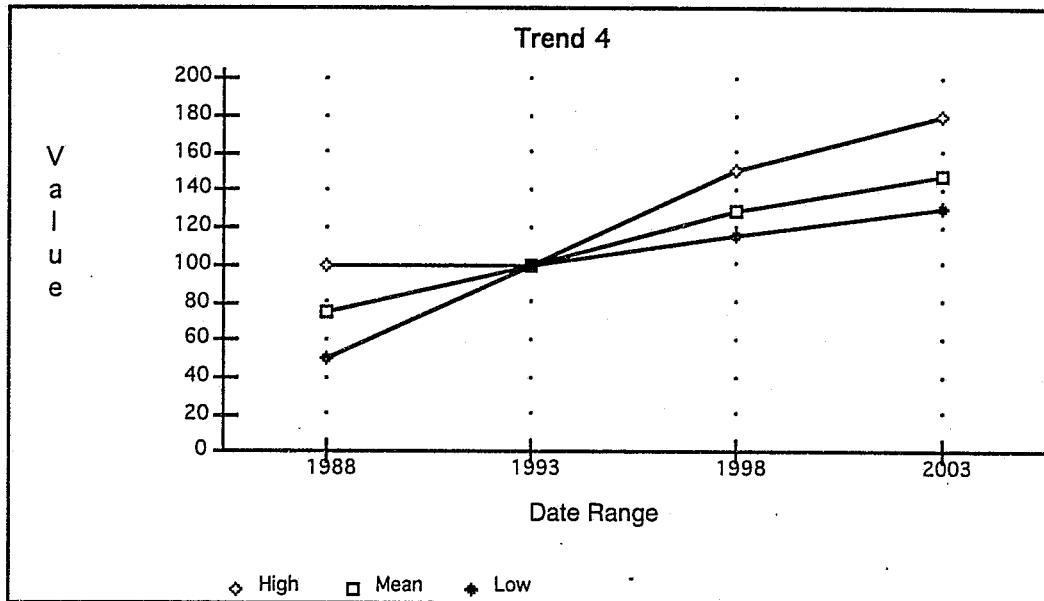


Reflective of this trend is the panel's belief that through grievances and court mandates custodial systems have been forced to be more effective in their management of prisoner populations. In many cases this has led to the use of technology due to the fiscal inability to staff at, what are considered to be, acceptable levels. Given the present fiscal environment, and the panel's belief the environment perhaps could even get harsher, the panel believed there would be increased pressure to develop management plans which provided for more effective management of prisoners through sophisticated electronic tools especially over the next five years. The panel felt this trend would continue to increase between the five and ten year marks, but not to the same degree as during the first five year period.

Trend 4:

Level of Fiscal Resources For The Funding of Public Agencies.

ILLUSTRATION 6



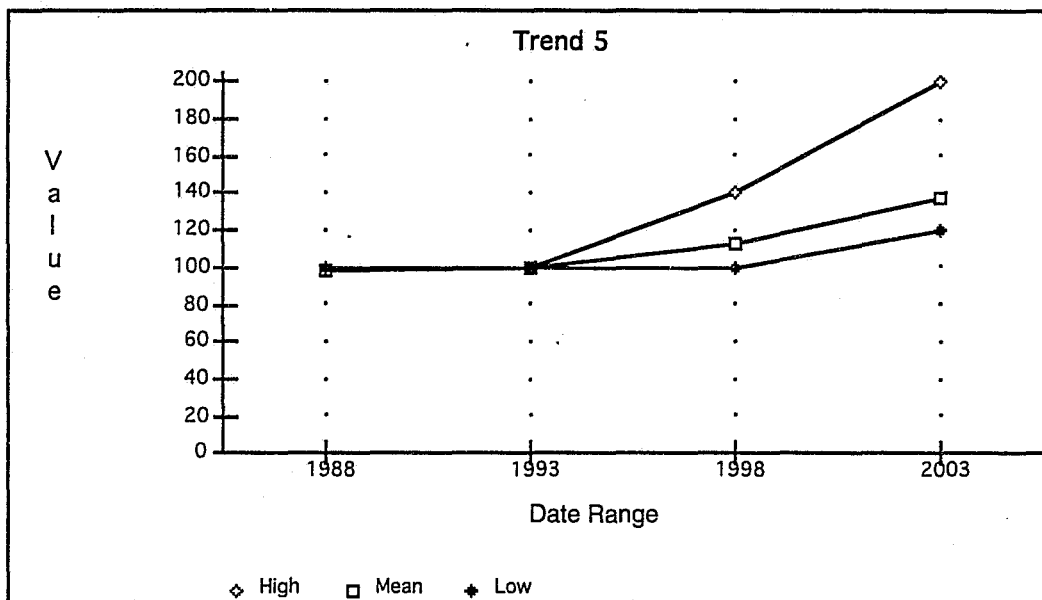
Panel members recognized the potential impact of the presently diminishing fiscal resources in the public arena. Generally the panel felt this trend would continue and, in fact, become more acute before there is any relief. However, The panel strongly believed there would be a rebound in future. The graph above reflects their beliefs in this regard.

Panelists felt that this trend related directly toward the need to meet challenges originating from reduced resources through technology in order to meet service level needs. The panel expressed the belief that the most effective technology would be that which permits swift and accurate handling of service demands. They felt that the adaptation of GPS/GIS technology would be a discipline that would reduce the time involved in searching for missing people.

Trend 5:

IMPLANT TECHNOLOGY BECOMES LESS EVASIVE.

ILLUSTRATION 7



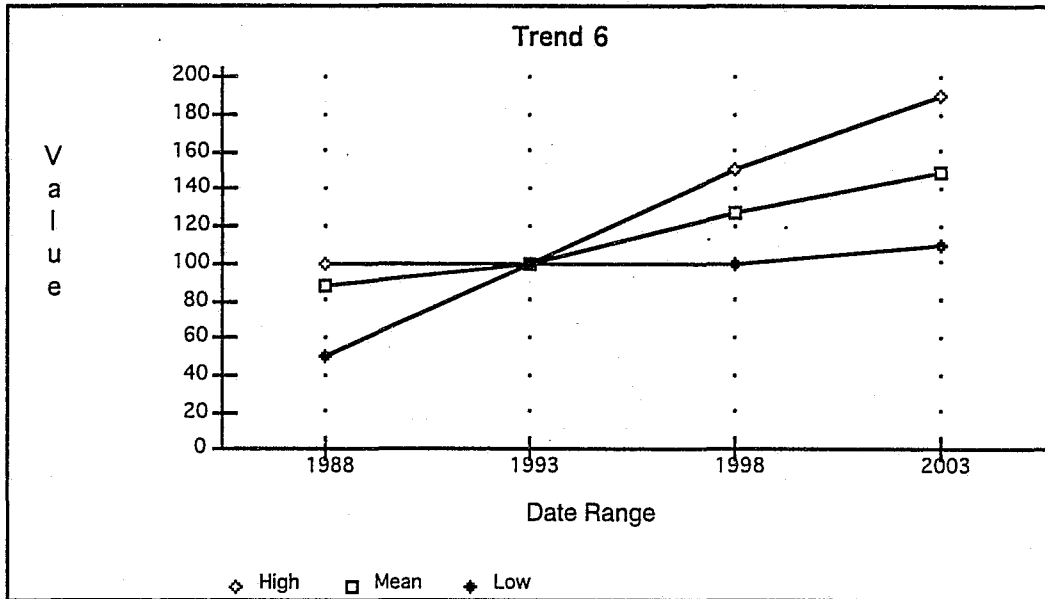
The panel considered the potential of tracking devices miniaturizing to the degree that would permit implantation of a tracking device in a person or animal. Panel members considered contemporary surgical practices of limiting invasion into the body during surgical procedures. The panel felt that, based on contemporary practices, and their refinement in the future, medical technicians would be able to accomplish many procedures through less evasive practices. The panel felt this combination might well lead toward implantation of devices capable of allowing involuntary tracking of persons or animals.

The panel felt there would be no single event that would propel this trend beyond the range expressed in the above graph. Progress will continue toward less evasive surgical practices but there will be little acceptance for implantation of tracking type devices.

Trend 6:

Degree To Which Technology Permits Organizational "Right-Sizing".

ILLUSTRATION 8



The members of the panel felt that technology, regardless from which arena it originates, will permit, if not encourage, additional reductions in the size of work forces. Panel members felt that there was history to draw from in this regard. Panelists felt economic conditions would also play a role in the adoption of technology.

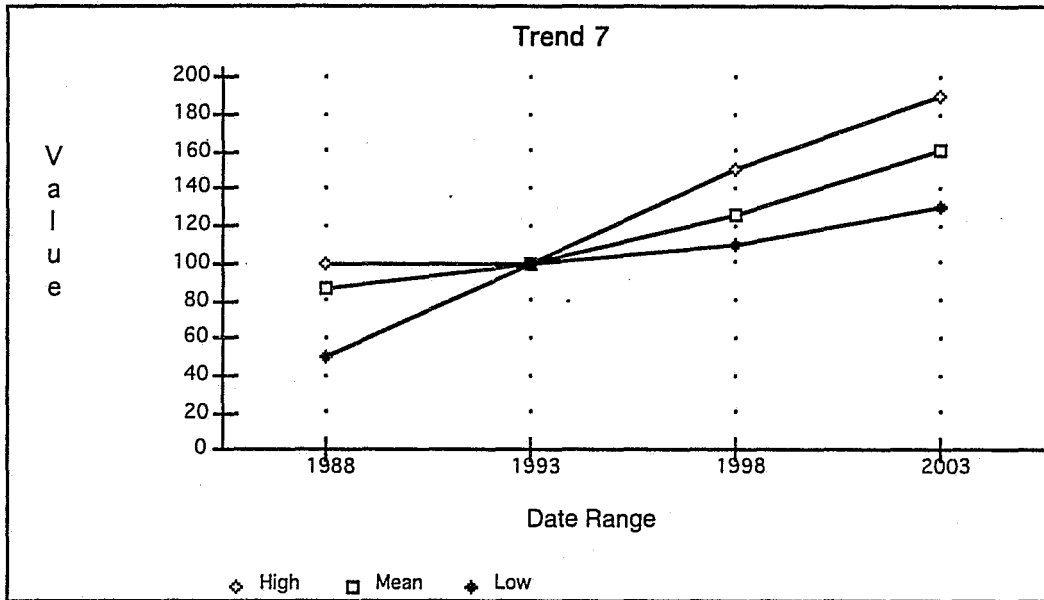
While most panelists felt strongly about technology encouraging reductions in the size of work forces there was an element that was reluctant to accept much additional reduction precipitated solely by technology. They felt the driving force would be economic in nature.

The panel also felt that work force reductions precipitated by economic conditions might well be met and mitigated through technology.

Trend 7:

Level To Which Technology Allows Tracking Of Alzheimer's Patients.

ILLUSTRATION 9



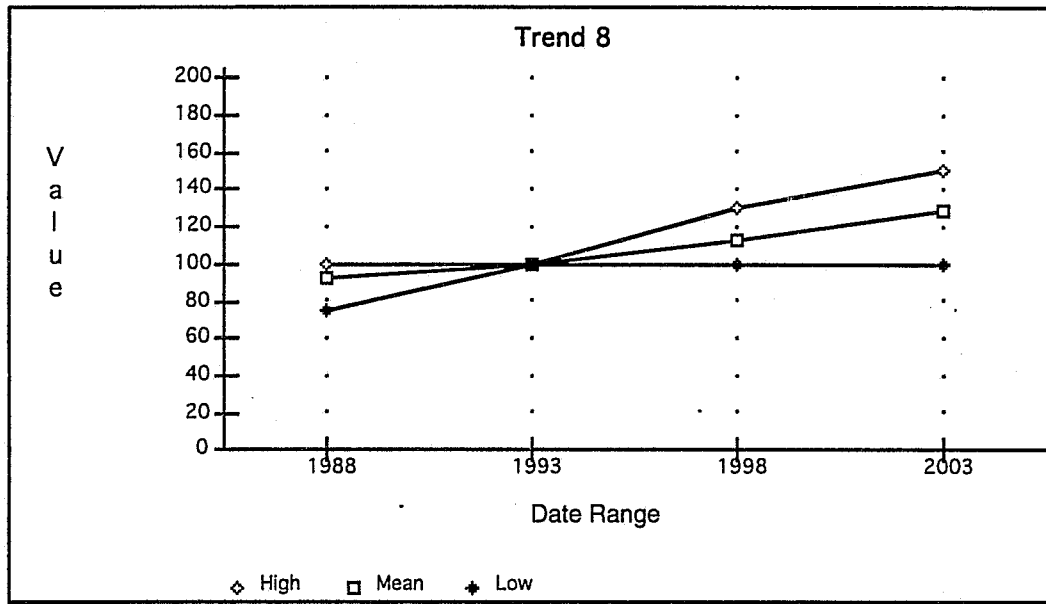
With increasing frequency and, usually, at considerable expense, law enforcement becomes involved in a search for those afflicted with Alzheimer's disease. Regardless of the circumstances of the disappearance a great deal of effort is generated in attempting to located the missing person.

The panel pondered the impact future technology would have on locating those who wander away from their place of residence. The felt confident personal position location devices would ultimately be of service in locating Alzheimer's patients and/or others similarly afflicted.

Trend 8:

Criminal Element Keeps Pace With Technology.

ILLUSTRATION 10

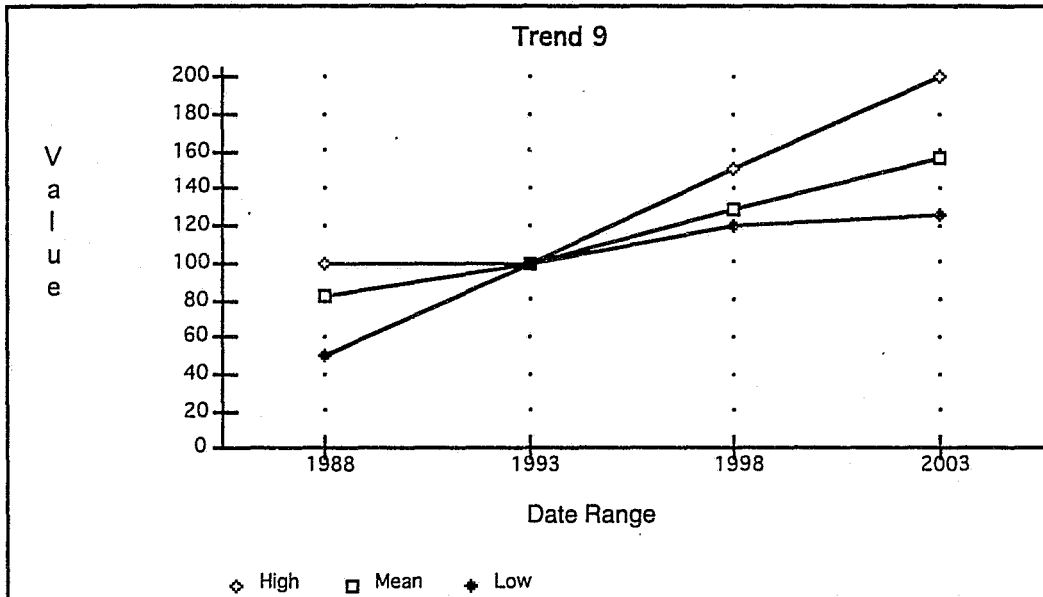


Panel members felt that the ability of the criminal element to keep pace with advancements in law enforcement technology would be an ongoing force to be reckoned with. Even panel members from outside the law enforcement community recognized the resources available to criminals who are not bound by court decisions, ethical considerations or budgetary constraints.

As related to personal position location technology the panel discussed the future possibility of this technology replacing home electronic monitoring devices presently sued by county probation departments. The panel felt the adaptation of personal position technology would have the potential of enhancing case management for overburdened departments with the side benefit of being able to monitor criminal activities for law enforcement.

Trend 9:
GPS Receivers Dropping In Price To Consumer.

ILLUSTRATION 11

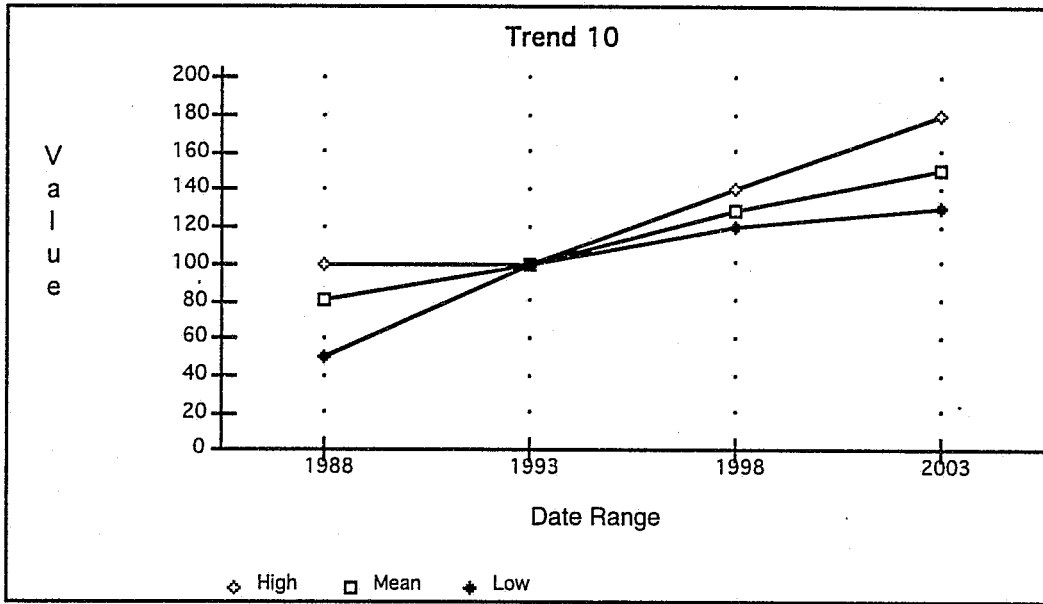


Certain panel members expressed enough familiarization with GPS equipment through personal experience and industry trends to be knowledgeable in the pricing history of receivers. Those panelists discussed the reduction in cost over the last several years and the likelihood for the trend to continue. The above graph reflects the results of the panels intuition regarding the future of the costs for GPS receivers.

Panelists likened this technology to that of the transistor radio. When first introduced transistor radios were bulky and expensive. As time passed transistor radios became more compact and more user attractive. As the market grew the prices dropped. That panelists drew a parallel with personal position location devices.

Trend 10:
Organizational Dependency on Computer Technology.

ILLUSTRATION 12



The panel considered a variety of ingredients that would tend to promote the proliferation of computer technology throughout law enforcement and business generally. Not the least of which is diminishing resources. Each panelist felt the challenges presented due to shrinking resources could be effectively met through computer technology and adaptations of what this technology offers. Inasmuch as GPS/GIS technology is heavily interfaced with computer technology the panel felt that the increased dependence they recognized in computer technology would reflect in more effective, user friendly GPS/GIS systems.

After reaching consensus on the final ten events, the members of the panel were provided an Event Evaluation Form (Illustration 13). The panel then forecasted the probability of the selected events occurring and their impact on the issue. Illustration 13 presents the mean results of the panels effort.

**ILLUSTRATION 13
EVENT EVALUATION FORM**

EVENT STATEMENT	YEARS UNTIL PROBABILITY EXCEEDS ZERO	Probability		Impact on the Issue Area if the Event Occurred	
		5 Years from 1993 (0-100)	10 Years from 1993 (0-100)	Positive (0-10)	Negative (0-10)
E-1, Constitutional Ruling Effects Use of Personal Position Monitoring Devices	2.6	80.0	100	4.5	7.3
E-2, Destruction of GPS Satellite System	6.4	0.0	5.0	0.0	8.2
E-3, 8.0+ Magnitude Earthquake occurs in CA.	1.0	75.0	80.0	6.0	2.0
E-4, Lawsuit by police labor unions.	2.0	80.0	80.0	0.0	8.0
E-5, Technical Advancements make Personal Position Devices Obsolete	6.0	0.0	40.0	2.0	6.0
E-6, Unexpected Breakthrough Dramatically Reduces cost of GPS/GIS Technology	1.6	70.0	100	10.0	0.0
E-7, Economic Failure of Government	5.0	5.0	5.0	1.0	8.0
E-8, Child Found Due to Personal Position Location Device	4.0	30.0	80.0	9.0	0.0
E-9, Accidental activation of PPLD's	8.0	30.0	50.0	0.0	7.0
E-10, Satellite Imaging Becomes Available to L. E.	4.0	30.0	70.0	2.0	6.0

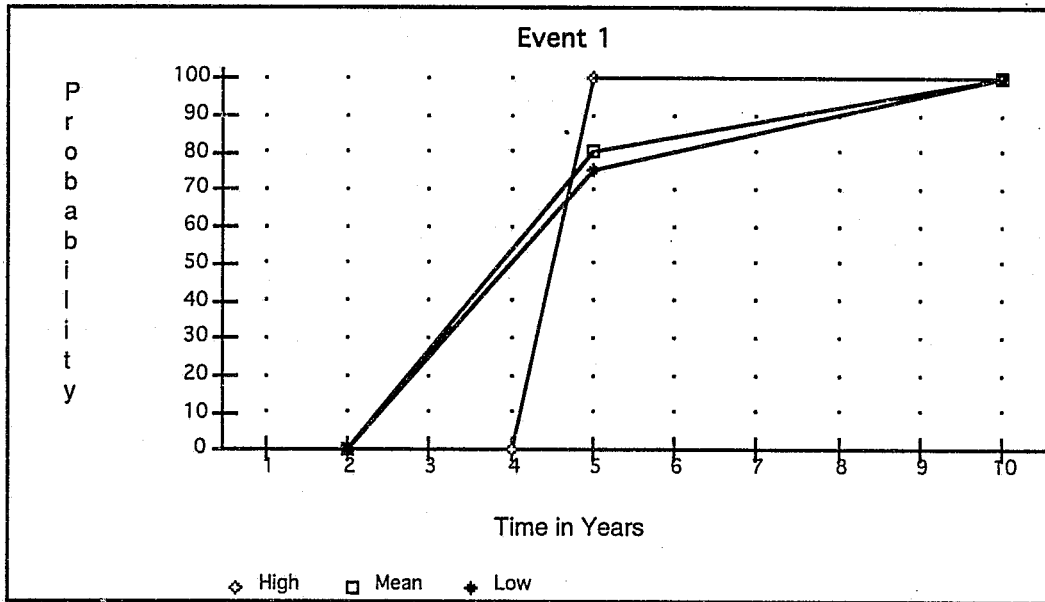
Event Graphs and Analysis

The following graphs offer an illustrative example of the events as forecast by the panel.

Event 1:

Constitutional Ruling Effects Use of Personal Position Monitoring Devices

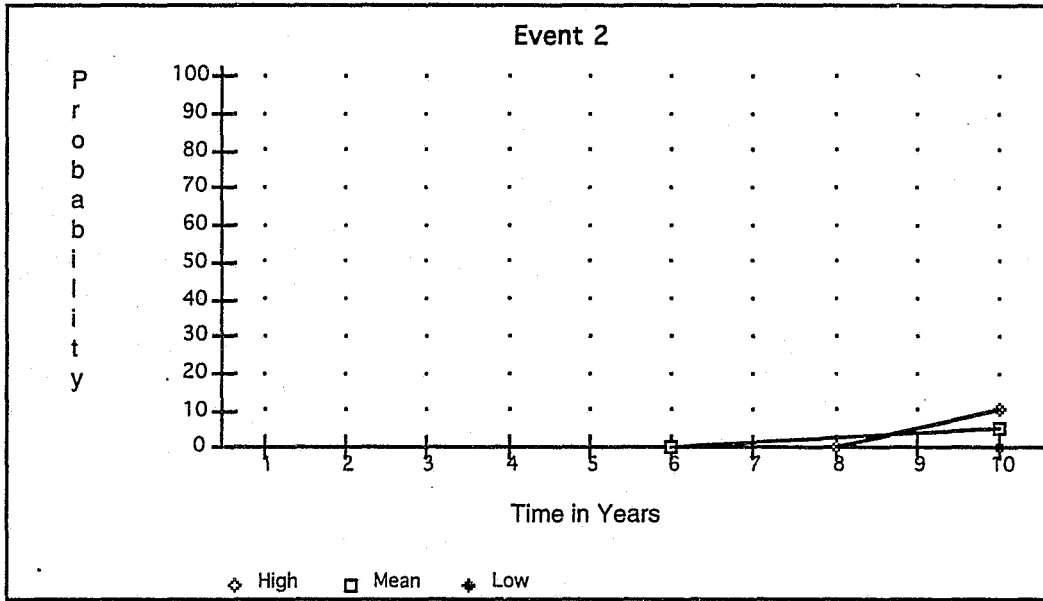
ILLUSTRATION 14



There was general consensus among the panel members that there would be a United States Supreme Court decision that would have an impact on the use of monitoring devices when used in non-voluntary situations. The consensus was that, if the decision was to occur, it would occur within the next five years and would have a major impact in law enforcement's use of the technology as an aid to monitoring convicted or sentenced persons. A greater number believed the impact would be negative.

**Event 2:
Destruction of GPS Satellite System.**

ILLUSTRATION 15

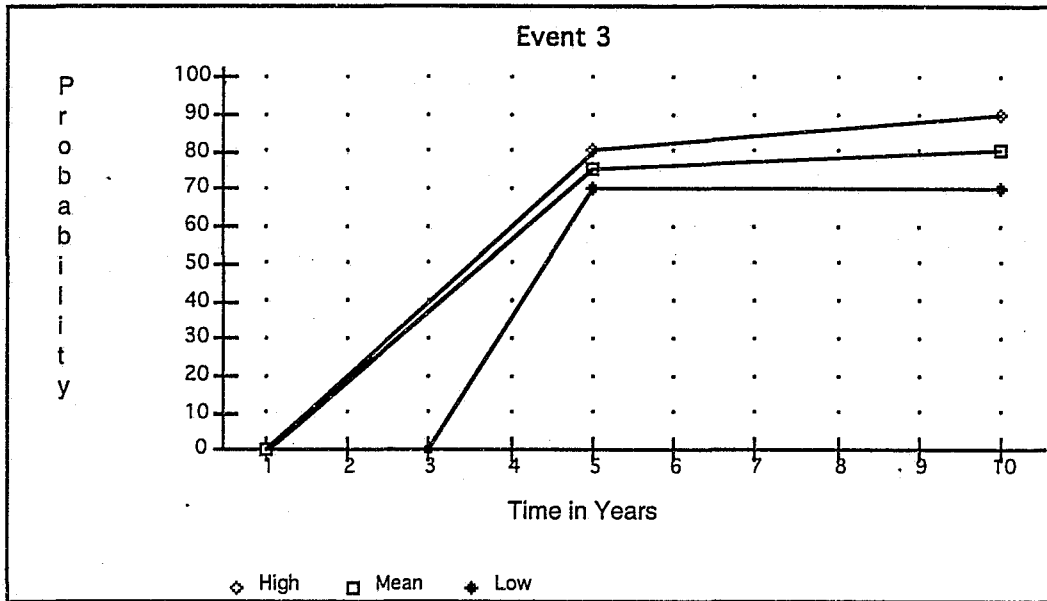


As indicated in the above graph the panel felt it was highly unlikely the GPS satellite system would be destroyed. They felt that there was a low probability over the given time period but felt if there was an act of vandalism or destruction it would most certainly be as the result of an international conflict and have a negative impact on the issue.

(The lowest estimated probability was "0" at ten years.)

**Event 3:
8.0+ Magnitude Earthquake Occurs in California.**

ILLUSTRATION 16



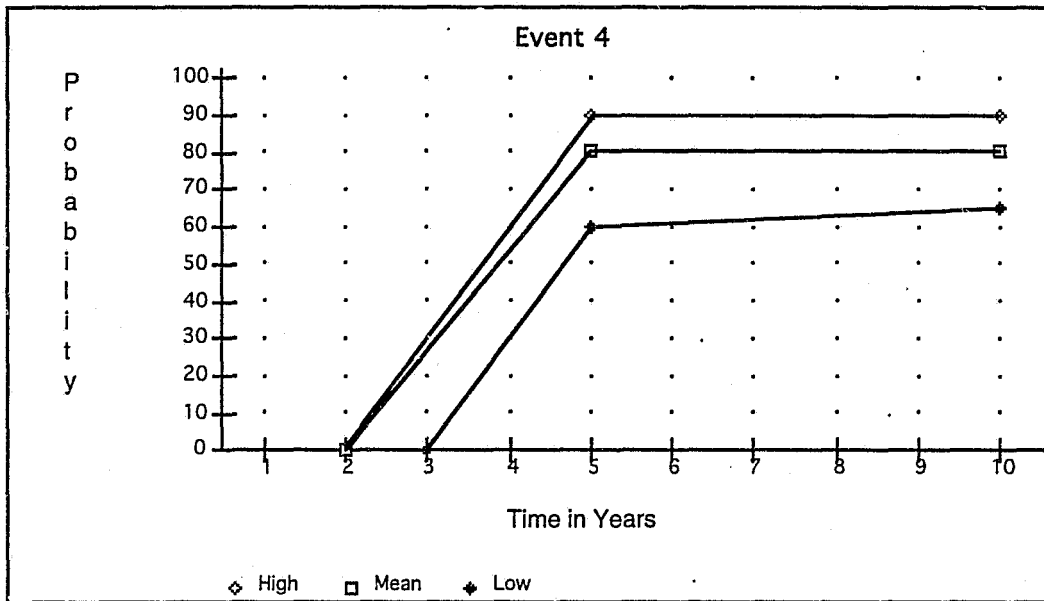
The panel felt there was a distinct possibility that California would suffer a major earthquake along one of its geological faults within the next ten years. This forecast was made before the quake that hit the Northridge area of southern California in 1994.

Panel members felt that personal position location devices would play a significant role in locating missing persons. The panel felt this role would promote the technology and demonstrate its viability and versatility.

Panel members expressed the opinion that even without personal position location devices, GPS receivers would play a role in disaster response organization and damage assessment.

**Event 4:
Lawsuit by Police Labor Union**

ILLUSTRATION 17

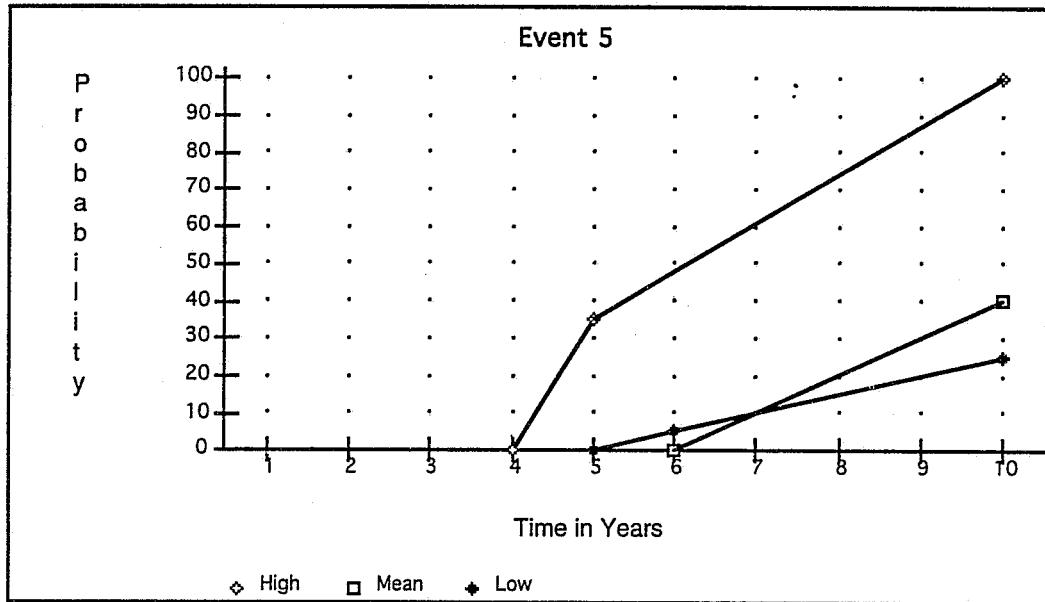


Panel members agreed that there would be a reaction from law enforcement labor unions over the capability of monitoring officer's actions while on duty. They felt that the reaction would be swift and strong. However, the panel expressed the belief that challenges might be mitigated through policy composition and a clear statement of purpose.

Event 5:

A Technological Advancement Makes Personal Position Location Devices Obsolete

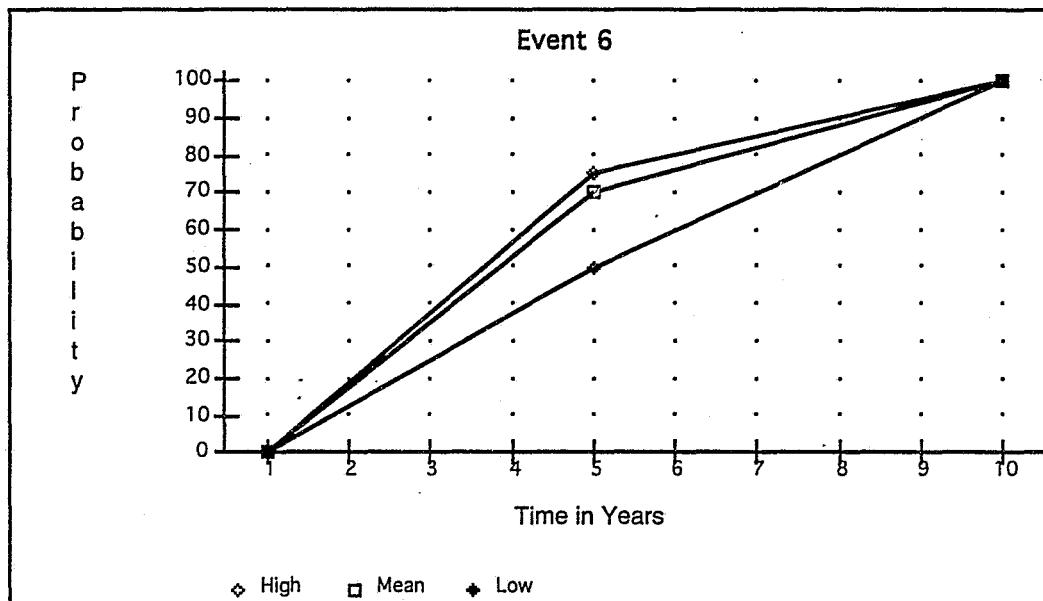
ILLUSTRATION 18



The panel felt, given the pace of technological advancement, there could be a possibility of a new technology available which may cause personal position location devices to become a less preferred option. However, the panel felt that if a technological replacement did appear it would not occur for approximately six years and have a 40% probability factor of being a replacement for personal position location type devices. The low probability factor was attributed to the expense associated with developing and introducing new systems.

**Event 6:
Unexpected Technological Breakthrough Dramatically Reduces Price of
GPS/GIS Technology.**

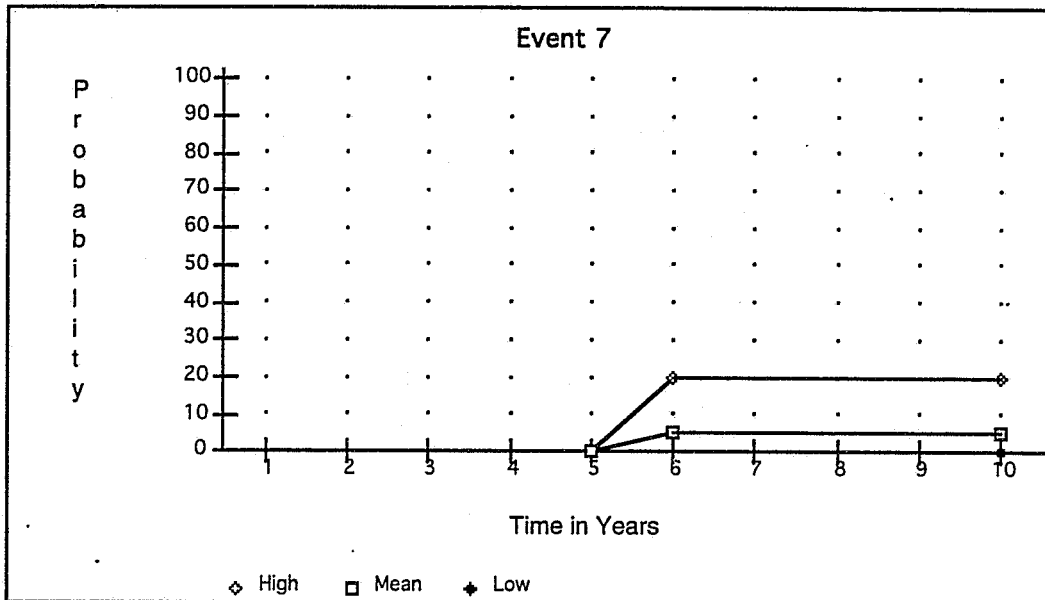
ILLUSTRATION 19



Recognizing the rapidly evolving changes involved in the world of electronics, the panel felt there would be a significant technological breakthrough that would lead to the reduction in cost of GPS/GIS devices. Such an event could have the potential of making personal position location type devices available to a broader spectrum of the market place. Most felt that this event would occur in a relatively short amount of time and would have a significant probability of occurrence within the next five years. The probability of occurrence was absolute by the end of ten years. The groups consensus was whatever occurred in this regard would have a very positive impact on the issue.

**Event 7:
Economic Failure of Government.**

ILLUSTRATION 20

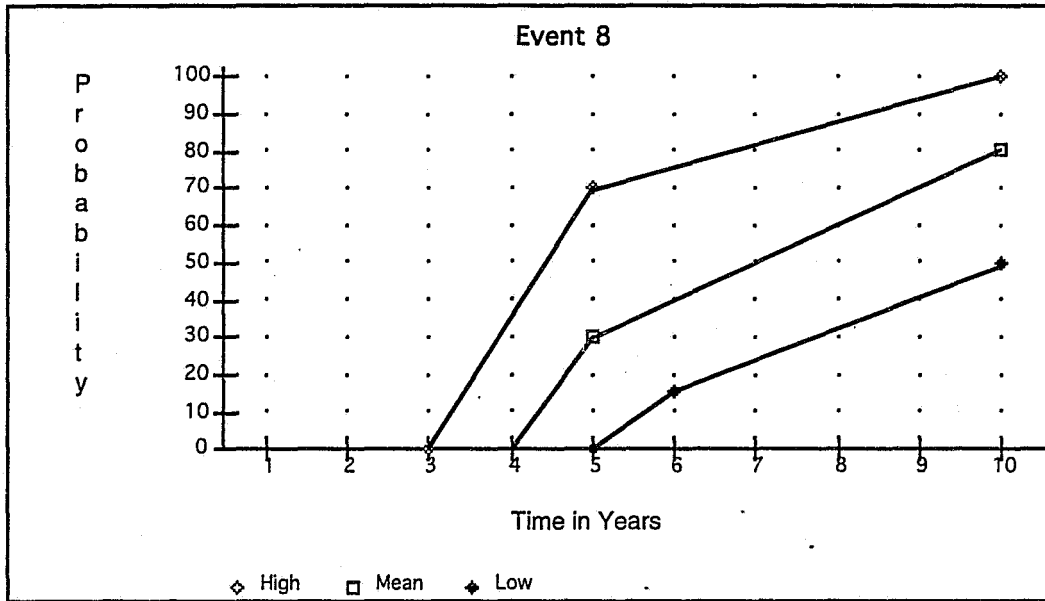


Examination of this event produced the belief that there was a very low probability of occurrence. If the event did occur it wouldn't occur until five years or after that time. The event would have an overwhelmingly negative impact on the issue. The panel members indicated that while they felt difficult economic times could be challenged through keeping pace with technology the lack of funding abilities caused by economic collapse would certainly leave no funding available to purchase any technology.

(The lowest probability is "0" at ten years.)

**Event 8:
Missing Child Found Due to Personal Position Location Device.**

ILLUSTRATION 21



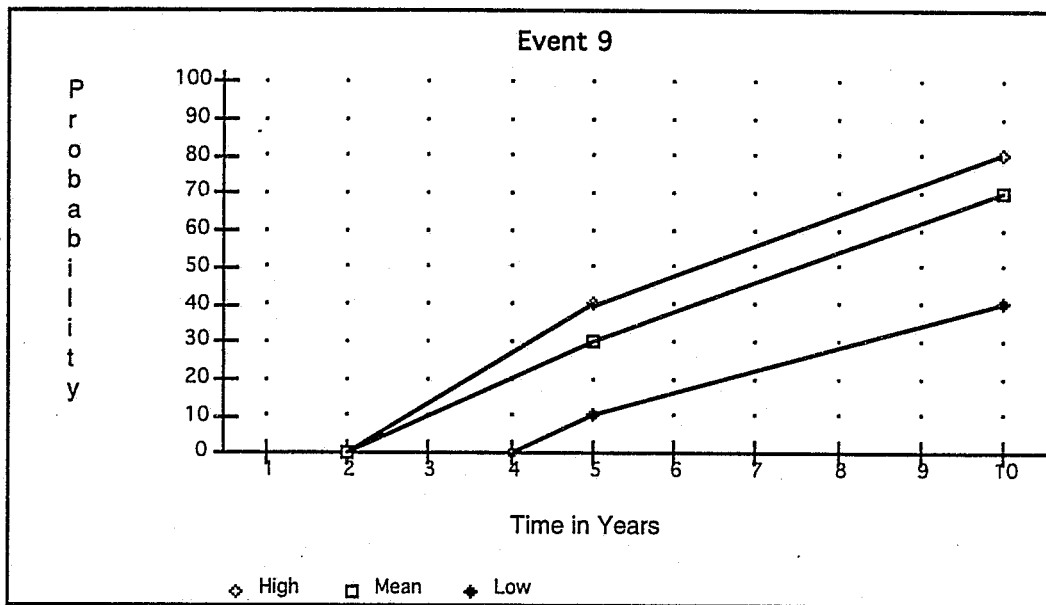
The members of the panel offered several events which, if they occurred, could promote the use of personal position location devices. Event 8 was one such event.

In discussion panel members envisioned a device that could easily be carried by anyone. The panel concluded that, should a child become lost or missing, the child could activate the device and their whereabouts would be relayed directly to the law enforcement agency having jurisdiction of the area.

The benefits of this application are obvious.

**Event 9:
Accidental Activation of Personal Position Location Devices.**

ILLUSTRATION 22



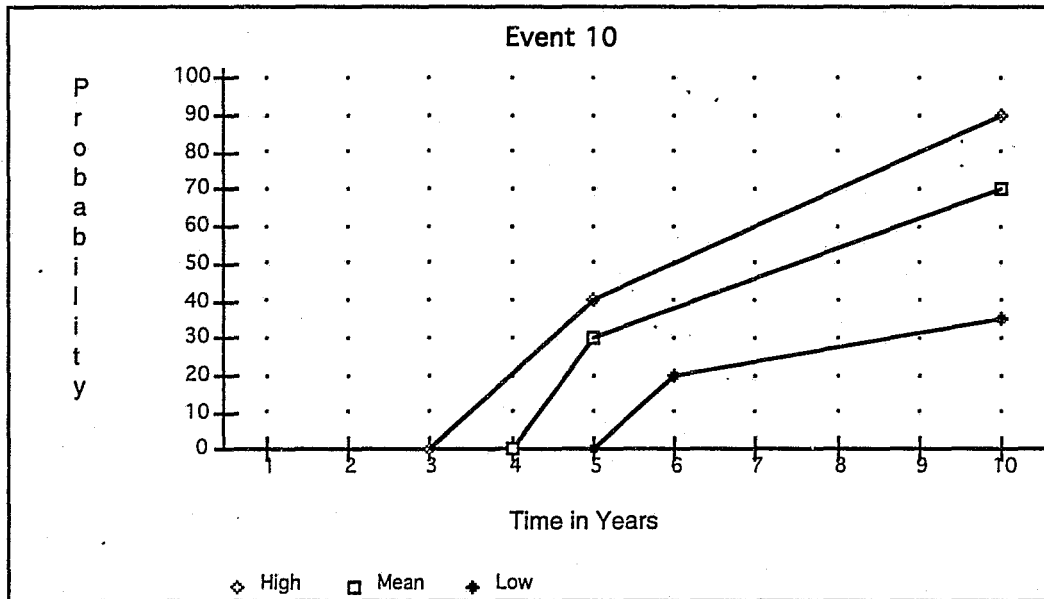
Panel members recognized the potential for accidental or malicious activation of personal position devices. The consensus was that a great deal of effort and expense could be lost on such situations. A significant negative reaction to the application of personal position location devices could result in the panels opinion.

Panel members felt civil and criminal penalties could reduce the potential for such occurrences.

Event 10:

Satellite Imaging Technology Becomes Available to Law Enforcement.

ILLUSTRATION 23



Members of the panel felt that real time satellite imaging may be the next wave on the horizon. High definition satellite imaging is presently available to, and being used by, the military. In certain limited situations this technology is available to law enforcement. However, the expense makes law enforcement use prohibitive in all but the most extreme circumstances.

Panel members felt, that while such technology might prove useful to law enforcement, the ability to spontaneously target a law enforcement officer in a pursuit might prove to be beyond the capabilities of satellite imaging as it presently exists. (It should be noted that none of the panel members professed intimate knowledge of current satellite imaging technology.)

Panel members perceived a general negative impact to the issue.

Cross-Impact Analysis

Upon conclusion of the NGT process the mean probabilities for each event were determined. The mean probabilities of each event were then used as base probabilities for each respective event.

Two individuals to assisted in a event-to-event cross-impact analysis. This process involves a determination of a rate of change for each initial event probability when the other events are compared against it. Each event could be impacted positively, negatively or there might be no impact at all.

Assisting in this process were:

- * Howard Butler, Sergeant, Allen County Police Department
- * Arthur Ritter, Captain, South Lake Tahoe Police

The results of their independent efforts were then averaged. The results were then entered into the computer program X-IMPACT.⁸ The X-IMPACT then tabulated final probabilities of occurrence for each event. Illustration 24 depicts each event, its respective original probability, the change resulting from the impact of the other events and the final probability of occurrence for each event.

CROSS IMPACT MATRIX

ILLUSTRATION 24

EVENT & INITIAL PROBABILITY	IMPACTING EVENT & CHANGE										FINAL PROBABILITY
	E-1	E-2	E-3	E-4	E-5	E-6	E-7	E-8	E-9	E-10	
E-1 Constitutional Ruling 90	X	-85	0	10	0	0	0	0	0	0	94
E-2 Satellite Destruction 5	0	X	0	0	0	0	0	0	0	0	5
E-3 Earthquake 79	0	-20	X	0	0	10	0	0	0	0	86
E-4 Lawsuit 80	20	-75	0	X	0	0	5	0	0	0	94
E-5 Obsolescence of PPLD's 40	0	60	0	0	X	-40	0	-20	20	60	36
E-6 Technology Cost Reduction 85	-30	-60	30	-10	-90	X	0	20	0	-1	45
E-7 Economic Failure of Gov't 5	0	0	0	0	0	0	X	0	0	0	5
E-8 Child found via PPLD 55	10	-50	0	0	-5	50	-3	X	-5	0	99
E-9 Accidental Activation 40	0	-60	0	0	-30	40	0	5	X	0	62
E-10 Satellite Imaging Available to Law Enforcement 50	10	30	5	-10	10	-10	-10	0	0	X	50

It should be noted that where an event would impact itself an "X" is entered as, for a practical matter, an event cannot impact itself.

Futures Scenarios

With the assistance of the computer program, SIGMA Scenario Generator⁹, alternative futures were generated based on the trends and events generated by the Nominal Group Technique panel. In order to achieve the futures scenarios the following data is entered into the program:

- * The event
- * The probability the event will occur by the end of the scenario
- * The positive and negative impact figures

The program compiled the various selected events and produced random scenarios of events that either did or did not occur. In excess of fifty scenarios were obtained via the program, each uniquely different. Based on the number of scenarios run, certain patterns began to emerge indicating groupings that commonly ran together. From the scenarios having common groupings three scenarios were selected based on the scenario being normative (desirable and/or attainable, as well as hopeful), nominal (that which would most likely happen), and hypothetical (what might happen having a best or worst case impact on the issue question).

The iterations selected for the various scenarios are displayed in Appendix C.

SCENARIO ONE - Nominal

California law enforcement began to recognize potential applications for the interfacing of GPS and GIS technology in the early 1990's. Initially, by combining both technologies, industry research and development specialists developed fleet vehicle management systems that assisted private business in locating fleet vehicles and managing their movements for more efficiency. Eventually, public safety agencies saw the benefit of GPS/GIS in responding to emergency calls more efficiently. While this initial application proved to be of benefit there were developments which tended to

make the GPS/GIS technology even more valuable to law enforcement through diversified applications.

As the technology matured design modifications and technical advancements permitted the miniaturization of receivers and transceivers (T-1). This trend in conjunction with the unexpected technical breakthrough in flexible circuit boards, which allowed a major price reduction in January, 1995 (E-6), made GPS/GIS a utility that found its way into many lives. As with any consumer product, a price reduction makes the product more desirable to a broader share of the market place (T-9). This too tended to have a positive impact the manufacturers ability to price the product more attractively.

Diminishing funding for public agencies persisted through the 1990's (T-1). Public safety agencies were forced to look for new ways of conducting business in the face of having to reduce staffing and equipment levels. Anything that might have aided in maintaining service levels, in the face of cutbacks, was attempted. Law enforcement managers wisely looked toward computer and digital technology as a means of filling the gap thus becoming more computer dependent (T-10). In certain cases managers looked to technology to give them advanced opportunity on "right sizing" through technology (T-6). However, administrators were sensitive to concerns of credibility issues that all too frequently arose from increased dependence on computer technology (T-2).

Public safety fleets were equipped with automated fleet management monitoring transceivers, either built into mobile data terminals or independent units. The value of these devices had already been established. Through the introduction of miniaturized, flexible circuit boards personalized location devices were marketed for more diverse uses.

Law enforcement administrators seeking to capitalize on this development sought to adapt the personal position location devices for law enforcement personnel believing the devices might offer a tactical opportunity in certain field deployment situations. Police labor unions reacted swiftly threatening a law suit (E-4). The issue that was raised was that of privacy. Field personnel felt it was unnecessarily intrusive for management to know their constant whereabouts. Legal challenges were averted by simply making activation of the devices voluntary, as opposed to automatic.

The use of automatically activated devices had proven useful in locating Alzheimer's patients (T-7). The devices would remain in a standby mode until the wearer left a certain radius. Once outside the deactivation zone the device would activate.

Due to the economic condition of the state, regionalization of law enforcement services was considered for a brief time. While the state saw the regionalization of services as a way of reducing duplication of services the populace felt threatened due to a loss of local control. The impending economic failure of government was averted (E-7) due to an economic turn around.

Up to this point in time technological advancements in the design of personal position location devices had promoted use of the devices. In August, 1995, a missing child was located due, primarily, to a personal position location device (E-8). Up to this point there had been a general concern that possession of the devices by children might lead to unnecessary search and rescue expense through accidental activation. Accidental activation did not occur as had been feared (E-9) and the device proved its worth. This single event probably did more to promote the use of personal position devices than anything else.

Experimental programs using personal position location devices were instituted that involved sentenced and unsentenced criminals (T-3). Having the precedence of the Home Electronic Monitoring Program (HEMP) to guide them, California parole and probation authorities found the personalized devices an extension of the HEMP program that could offer continual monitoring when necessary. Miniaturization had reached a point where implantation of a device in a human seemed feasible. With implant procedures becoming less evasive, combined with successful tests in animals the potential to implant the device in a person seemed possible. Parole and Probation authorities hailed the development as a way of shoring up staffing reductions. Additionally, implanting the devices might reduce the level to which the devices could be sabotaged (T-8).

In April, 1999 the American Civil Liberties Union (ACLU) filed a motion raising constitutional issues regarding the use of the devices being an unfair invasion of privacy. The US Supreme Court agreed to hear the matter (E-1). While awaiting a decision from that court use of the implanted devices has been put on hold.

In July, 1999 satellite imaging became available for general law enforcement use (E-10). It appeared, for a brief time, that satellite imaging could make the use of personal location devices obsolete (E-5). However, the replacement did not occur as the expense related to access time limited access to only critical situations.

In July ,2000, southern California experienced an earthquake that registered 8.0+ on the Richter scale (E-3). GPS/GIS technology and satellite imaging were credited with saving many lives due to the time saved in locating victims. Additionally GPS/GIS mapping services saved time and expense in disaster assessment and mitigation efforts.

In September, 2000, the US Supreme Court issued a constitutional ruling(E-1) supporting the use of GPS/GIS monitoring in certain situations. The court only addressed the use of transceivers in monitoring criminals, as the case brought to the court involved the appeal of the conviction of a convicted murderer who was on parole at the time she was arrested for a sexual assault. Evidence presented indicated, that by virtue of the transceiver the defendant had been issued upon parole, there was conclusive proof the defendant was present at the location at the time the sexual assault occurred. The court felt that this evidence was compelling when linked with the identification of the defendant by the victim.

SCENARIO TWO - Normative

During the early part of the 1990's the state of California experienced an unprecedented lethargic recovery from a nationwide recession. The state's economic outlook was bleak and most facets of services to the public were impacted. The decline in fiscal resources available to fund public agencies (T-4) forced a reduction in staffing, in many cases causing a reduction in service levels. Public safety managers, law enforcement and fire, considered many options to reduce the impact of their losses with the goal being to maintain the integrity of their communities as much as possible.

Conditions had threatened the economic collapse of certain local governments. However, conditions did not allow any local governments fail economically (E-7).

Public safety managers soon realized that one avenue toward stabilization might be through the adaptation of certain technologies which might offer a reduction in job task time and effort. Past experiences with computer technology offered historical evidence that the use of computerized devices tended to reduce job time and function permitting one person the opportunity to perform job tasks quicker, previously done by several at a greater expense of time (T-10). In many circumstances technology permitted

organizational "right-sizing" that was a popular, and perhaps justified trend during the 90's (T-6). Administrators were constantly vigilant to prevent credibility issues from arising through increased computer use (T-2 & T-6).

One such technology that emergency service agencies employed that offered the qualities that met some of their needs was personal position location devices.

Aided by a reduction in transceiver and receiver sizes as the utility matured (T-1) diverse applications seemed to meet many of the needs of the law enforcement industry. Along with miniaturization and greater consumer acceptance came lower prices (T-9). However, in May, 1995 a significant event occurred which allowed an unexpected reduction in production cost to be passed on to the consumer (E-6). This advancement also created additional design diversification which resulted in new market arenas being explored. The design opportunities coupled with reduction in prices offered many agencies solutions to nagging personnel management and service issues while allowing for certain critical job tasks to be monitored with computer assistance (T-10).

As the use of personal position location technology gained wider acceptance several events occurred which caused the technologies growth to stifle a bit, at least as applied to law enforcement. In May, 1996 peace officer bargaining units balked at equipping field officers with devices that permitted the monitoring of a officer's whereabouts and threatened a lawsuit (E-4). However, settlement was reached out of court. Modification on how the devices would be activated was reached and all parties were satisfied.

In November, 1996 an earthquake struck California which measured in excess of 8.0 on the Richter scale (E-3). Personal position location devices were credited with saving many lives. GPS/GIS related technologies aided greatly in disaster relief efforts.

In April, 1998 the Defense Department announced that satellite imaging technology would soon be made available to law enforcement (E-10). Adoption of this technology would have tended to make GPS/GIS obsolete (E-5). However, the transition to satellite imaging would take at least eight years for the agencies that could ultimately afford to use it. Most agencies did not have the resources to convert.

While high resolution satellite imaging had achieved remarkable results, the use of this observation tool by law enforcement was somewhat compromised by expense, access and the ability to spontaneously target an individual. Consequently, most agencies believed that personalized position location transceivers offered more positive identification based on being issued to or possessed by an individual.

Surgical implant techniques had become less evasive as the decade moved toward its end (T-5). This in conjunction with continued device miniaturization caused some interesting, but as yet, untested internal transceiver device applications to be considered. Parole and probation officials considered the use of personal position location transceivers for the management of their case loads (T-3). However, this application lacked authorization.

Late in the 1990's full scale war erupted in the Middle East between a third world country and a US ally. The GPS system provided tactical advantages to both sides. However, the system was degraded after the third world country threatened to destroy the GPS satellite system (E-2).

The degradation affected the use of GPS dependent systems for the length of the conflict. This incident created some credibility issues for public safety agencies due to increased dependence upon computer technology (T-2).

In January, 1999 the US Supreme Court, consented to review the constitutionality of using personalized position monitoring devices on non-custodial sentenced and unsentenced prisoners (E-1). By that time the devices had become a standard way of managing criminals due to custodial overcrowding and understaffing.

Design modification had allowed the devices to be worn as unobtrusive leg bands that could not be removed without activating an alarm. The design change became necessary due to the criminal element being able to remove the devices (T-8).

Throughout the later portion of the decade personal position location devices were credited with finding many Alzheimer's patients (T-7) who had inadvertently wandered off.

SCENARIO THREE - Hypothetical

Throughout the early portion of the 1990's personal position location devices had become popular with a growing segment of society. These devices not only had the capability of allowing a person to know exactly where they were, but under certain conditions the devices could also let a person at a remote location know the whereabouts of the possessor of the device.

In July, 1995 a significant event occurred which proved the worth of personal position location devices. California experienced an unprecedented earthquake measuring 8.0+ (E-3). Personal position location devices were credited with saving many lives as they

permitted rescuers to expedite the search processes and free victims much sooner. Not only did the devices save lives but they also permitted disaster recovery operations to move more smoothly following the event.

By this time design modifications had made the devices much smaller and more convenient to carry (T-1). This increased the market share for the GPS/GIS industry, which in turn, led to lower prices (T-9). In December, 1995 personal position location device manufacturers enjoyed the benefits of improved trade relations with Japan and were able to drop prices dramatically (E-6).

Law enforcement throughout the state endured continued diminishing fiscal resources, as did other facets of government (T-4). This condition encouraged law enforcement practitioners to consider new applications to carry out their respective missions. Computer related technology played a significant role (T-10). Personal position location devices were but one tool that occupied their arsenal. The instruments had proved to offer time saving advantages in many applications.

Generally, the gravitation toward computer technology had proved of benefit in attempts to "right-size" (T-6). However, as with anything that is perceived as over done, issues began to arise regarding the use of computer information (T-2).

A growing societal problem involved the management of Alzheimer's patients. This was due in part to the escalating costs of health care and the fact that a great many more people were living much longer. Personal position location devices had proven useful in tracking Alzheimer's patients who had walked away from their familiar surroundings (T-7).

Additionally, parole and probation officials, facing the same budgetary consequences as law enforcement, had adapted the devices to remotely monitor those who filled their case loads (T-3). In this application the devices were attached to the subject using a non-removable band. Time and effort savings were realized through this application. However, the criminal mind is not to be underestimated. Continual efforts were made at frustrating the devices (T-8).

In an attempt to eliminate tampering, research and development specialists worked on miniaturizing the device to the point that they could be implanted within a person. With implant surgery becoming less evasive it seemed a possibility that would offend the consciousness less (T-5).

In February, 1996 a personal position location device provided a solution to a problem that had caused grief to a good many families for years. A child, abducted by a stranger, was located within several minutes after the child activated a personal position location device that the child had been carrying (E-8).

The growing use of personal position location devices in involuntary situations had been challenged throughout the courts finally making its way to the US Supreme Court. The core issue involved whether or not the use of the devices in involuntary situations constituted an invasion of privacy and unlawful seizure (being able to know a persons whereabouts at all times).

In December, 1998 the Court ruled that the use of the devices did not violate right to privacy or unlawful seizure protections afforded through the Constitution (E-1).

During the 1990's satellite imaging had been made available to law enforcement from the Department of Defense (DOD) in certain limited situations. In June, 1999 DOD broadened the availability to law enforcement while making use more cost attractive (E-10). As with any attractive new device or utility, law enforcement officials were drawn to the potential that satellite imaging offered.

The question that begged an answer: Would satellite imaging replace personal position location devices?

Due to the fact that virtually nothing is fool proof, the use of personal position location devices came at some expense. Accidental triggering of the devices had long been a problem which had cost law enforcement and the Coast Guard considerable expense in "false alarm" responses. The problem seemed to be epidemic in August of 1999 (E-9).

This caused senior administrators to revisit the use of satellite imaging as an alternative to GPS/GIS based devices. After examination, the expense associated with the use of satellite imaging involved considerably less than was being spent for manufacture, use and response to personal position location devices (E-5). Law enforcement acknowledged that satellite imaging alternatives were preferential to personal position location devices in October, 1999.

Threatened by use of a medium that they could not control, law enforcement labor unions filed an injunction in December, 1999 (E-4).

Policy Considerations

Policy considerations are based on the normative scenario, scenario two, due the fact it is attainable and hopeful. That future includes adoption of personal position location technology by a wide spectrum of society. Specifically, the future is realistic for law

enforcement as it presents a strategy for meeting the challenges of dealing with diminishing resources while attempting to maintain satisfactory service level.

The policies will be for a smaller mid-sized California police department. The South Lake Tahoe Police Department will be the model agency.

The present policy of this department is to:

- * strive to meet service levels of our community
- * search out technologies which will enable peak production
- * use technology to minimize the impact of diminishing fiscal resources
- * be creative in the application of technology
- * when practical decisions made regarding change will be made through a consensus based approach

SECTION III

STRATEGIC PLAN

The purpose of this section will be to develop an implementation plan for the South Lake Tahoe Police Department as a model (or other medium-sized police department) to realize the desired future based on the selection of the normative scenario from the futures study. This scenario represents the most attainable and realistic future.

The South Lake Tahoe Police Department is a smaller mid-sized rural police department located in an alpine setting. The Department serves a resident population of approximately 22,000 in a highly transient environment. During the summer months, with the opening of summertime only residences the population swells to approximately 50,000, and with the daily influx of tourists the Department faces the possibility of serving a population of 200,000. The population bridges all age groups and is ethnically and culturally diverse. The Department employs approximately 70 employees, 52 of which are sworn officers.

South Lake Tahoe, like many other areas throughout California, has faced annual budget reductions due to a prolonged recessionary economy. The senior city staff has established a goal of being able to meet the challenges of future budget cuts through automation. This goal provides the added benefit of streamlining certain operations. Anything that aids in meeting the goal is being considered. The use of personal position location devices may well be one of the future building blocks in the automation arsenal.

The components of the strategic plan are:

- * Mission Statement
- * Environmental Analysis

- * Organizational Analysis
- * Strategy Development
- * Implementation Plan

Mission Statement

The mission statement comes in two forms: macro and micro. The macro mission statement reflects the organizational statement to the community and those employed by the department. The micro mission statement is specifically tailored to the issue.

Macro - We, the members of the South Lake Tahoe Police Department, in order to ensure the highest level of service to our community, to live to the highest standards of ethics that reflect the dignity of our noble calling, to establish a high quality of work life for those who have committed their lives to the safety and well-being of our fellowman, do hereby pledge ourselves to the following:

We recognize that our primary mission and highest priority is to serve our community in the most professional, courteous and efficient manner possible. To that end we will always strive to nurture a partnership between the Police Department, the City Family and the Community based on trust and respect. Knowing that our Community is evolving and rich in cultural and ethnic diversity we will continually reach out and seek its needs and concerns. In doing so we will honor and preserve the rights of every citizen and colleague embracing the principal or respect for differences in race, creed, style and personal opinion.

In order to be successful in our mission, each of us acknowledges his or her worth as an important part of the whole and thereby accepts all the rights and responsibilities in a position of trust within the community. As an ongoing process, we will strive to improve ourselves, the Department and the Community. We view our Department as a living, growing enterprise and will remain flexible to positive change. We will strive to exceed the highest ethical standards of our profession and be steadfast in our commitment of duty.

Micro - It will be our goal to commit ourselves to provide levels of service which will meet the expressed and implied needs of the community we serve. Being mindful of the diminishing resources available to public safety organizations it is incumbent upon each member of the department to search for techniques and explore opportunities that may encourage maintenance of services while remaining fiscally responsible.

To that end we believe there is benefit in certain technologies that may enhance our abilities to meet our goals. Our purpose will be to examine these technologies to determine their anticipated benefit and, if found beneficial and fiscally responsible, adopt the considered application.

In as much as change is easy for some and more difficult for others, we will strive to develop consensus supporting any technology or process to be introduced into our

organization. We will develop transitional strategies which offer consideration to all we serve and employ.

Situational Analysis

An examination of the internal and external situational environment relating to the issues and sub-issue questions employing the WOTS UP (Weaknesses, Opportunities, Threats Strengths, Underlying and Planning) aids in directing the organization's development of the desired strategy.

A group of three colleagues collaborated with the author to develop a consensus based situational analysis and identify stakeholders and assumptions regarding the identified stakeholders. The members of the group were:

- * Scot Berry, Captain, Yuba City Police Department
- * Bruce Muramoto, Captain, West Sacramento Police Department
- * Pam Sullivan, Law Enforcement Technician, South Lake Tahoe Police Department

Environmental Analysis

An environmental analysis of an issue identifies the opportunities and threats related to the issue. The analysis should also be useful in determining the impacts of the noted opportunities and threats on the mission as previously outlined. Certain opportunities impacting the issue will be examined followed by items construed to be threats.

Opportunities are defined as: Any favorable situation in the organization's environment, often a trend or change of some kind or an overlooked need, that supports the demand for a product or service and permits the firm to enhance its position.

1. Electronic devices tend to miniaturize and present expanded marketing appeal as manufacturing expense is reduced through technological advances.

Historical trends support the contention that as an electronic device is manufactured more compactly the device has become popular, providing the item has any market appeal in the first place. The reduction in size has broadened market appeal and application for many such devices. Through a broader appeal and larger market share the manufacturing costs for such items can be reduced through larger production runs and the resulting savings can, and often is, passed on to the consumer thus making the ownership of the particular device more attractive and attainable. An illustrative example could be the transistor radio.

Trimble Navigation, Motorola, and Micrologic are firms which were initial leaders in the field of GPS navigation devices. As each firm was able to design more compact and reliable receivers and transceivers, in the case of vehicle tracking systems, their products found a greater consumer acceptance. As consumer acceptance and confidence grew production runs became longer running thus reducing the manufacturing expense which translated to a lower cost to the consumer. With the increase in popularity of the devices and the increased diversity of application the market place became more competitive which also had a reaction of cost to the consumer.

2. Diminishing fiscal resources for the funding of public agencies will cause administrators to find creative new methods of offering services in the face of reduced staffing.

While there are those that might argue the loss of fiscal resources is a threat to the advancement of technology, it is the authors opinion that, in this particular case, a challenging opportunity is created to the law enforcement administrator. The opportunity is to take advantage of technology to offset the reductions in fiscal

resources. Further, the challenge is to identify and promote technologies which assist in reducing task effort.

Should the current economic conditions in California continue it may be that the law enforcement administrator of the near future will have to make the sensitive and potentially inflammatory decision of sacrificing a position within the department for the acquisition of a technology that will effectively take the place of several personnel.

3. Public and private organizations develop an increased dependence on computer technology and those technologies that evolve from computers.

Law enforcement, as well as industry, has recognized the value of computer assisted job functions. The computer, once viewed with suspicion and anxiety has found a place in the everyday world of law enforcement. This trend is likely to continue and grow.

Law enforcement will continue to adapt the computer to increased uses.

4. The present atmosphere of developing partnerships toward prevention and solving community based problems creates a natural vehicle which encourages the development of technology to aid in the solving of problems.

The hue and cry for law enforcement in the early part of the decade has been to develop partnerships that focus on prevention. Technology of all types has been welcomed to aid where it might. This atmosphere creates an excellent opportunity to continue the development of law enforcement related technology.

Threats are defined as: Unfavorable circumstances, conditions or situations within an organization. Threats, as related to the issue, would be those conditions which might stand in the way of or hinder implementation.

1. Perception that position location technology infringes on civil rights leads to constitutional challenges which would restrict use.

One of the more closely guarded civil rights, protected by the constitution, is the right to be free from unreasonable searches and seizures. This entitlement is closely followed by the right to privacy. Depending upon the application of the technology it would seem reasonable to anticipate a constitutional challenge.

The challenge could well come from a law enforcement labor organization or an organization representing prisoner rights.

2. Electronic technology paranoia.

As electronic devices become more sophisticated and diverse it would seem reasonable to anticipate a certain amount of paranoia. A scenario similar to Orwell's "Big Brother" syndrome might well be viewed as the end result from more invasive technology. This reaction would certainly have to be viewed as a threat to the development and implementation of position locating devices.

3. Law enforcement labor unions react adversely to the opportunity for their members movements to be monitored.

In terms of the application of the technology as an aid to law enforcement officers for personal protection a negative reception from law enforcement personnel would negatively impact application of the technology with law enforcement.

4. Technical advancements make personal position location technology obsolete.

Electronic technology is constantly improving and changing. The distinct likelihood exists that a new form of position locating will be developed that will impinge on GPS/GIS position locating devices. However, a newer technology, such as satellite imaging, will likely come with a prohibitive price tag and may not be a distinctively selective as a position transceiver.

Organizational Analysis

In addition to analyzing environmental circumstances related to the issue, it is equally important to assess the organizational capabilities of our organization to achieve our mission. In order to accurately assess organizational capabilities it is necessary to examine specific strengths and weaknesses related to the issue.

Strengths are simply resources that might be used by an organization to effectively reach its goals.

1. Law enforcement is skilled at creatively adapting technology to uniquely aid in the law enforcement mission.

Throughout the past two decades law enforcement has been able to recognize the value of technology developed for other industries and adapt it to meet the needs of public safety. The South Lake Tahoe Police Department has developed a receptiveness to the benefits of technology.

California law enforcement has been uniquely served in this regard. California is home to computer industry leaders. For decades the state has also been the home to numerous defense industry firms and military installations. Technology devised for military purposes has been frequently converted to law enforcement uses with the consent of the military and at the encouragement of law enforcement and electronic

industry marketing and research personnel. With the end of the "cold war" era marketing strategists have already targeted the law enforcement industry.

2. California law enforcement is resourceful, well trained and well equipped.

Law enforcement throughout California is recognized as being advanced in training practices and policies. This is due in part to entry level educational prerequisites and structured ongoing training requirements that provide uniformity and conformity throughout the state. Additionally, the citizens of the state place a priority on public safety and have insured their law enforcement personnel are equipped to meet the challenges of a continually changing criminal element.

3. California law enforcement is willing to follow the successful practices established in the private sector that have value in the public sector.

Public safety organizations throughout California have prided themselves in recognizing the valuable contributions made in the private sector. Where practical law enforcement has adopted practices, policies and procedures that have proven useful in the private sector that have application in the public sector.

4. California law enforcement is adopting a more analytical approach to change which makes change less traumatic.

Law enforcement throughout the state of California has had the benefit of being able to observe some fairly progressive business enterprises develop participative styles of management. Many law enforcement organizations have adopted varying styles of participative management. Regardless of the style or the depth to which the

organizations have immersed themselves, this type of management embraces techniques which tend to reduce anxiety levels associated with change.

True participative management involves the line levels of the organization in the beginnings of change and solicits input from all facets of the work force.

In 1991 the South Lake Tahoe Police Department developed and implemented a participative management model.

Weaknesses are obstacles, detractors or faults which might keep the organization from achieving its goals and objectives.

1. The continued decline of the economy throughout the state forces ongoing reductions in staffing and effects organizational abilities to purchase and maintain equipment.

As mentioned during the environmental analysis the economy plays a significant role in funding abilities. While evidence exists that law enforcement administrators will be forced to adopt technology to offset other losses the possibility exists that the economic impact could be so great as to limit the opportunity or importance of technology. Goals should and aggressive strategies should be established that provide for funding contingencies.

2. Goals and objectives of the technology not being clearly expressed could likely lead to paranoia among line personnel.

In spite of any efforts to construct a path for orderly change elements of human nature might present barriers. Whether the barriers are constructed from within the organization or from outside influences the results are just as disruptive.

Stakeholder Analysis

The final phase in the situational analysis involves an identification and examination of stakeholders related to the issue. Stakeholders are organizations, groups or individuals who either 1) impact what you do; 2) are impacted by what you do; or 3) are concerned about what you do.¹⁰ Stakeholders not only have an interest in the success or failure of the strategic issue being addressed in the strategic plan, but their acceptance of the plan is critical to implementation.

Certain stakeholders are easily identified, with their relative position being obvious. Others are not as detectable and may present unanticipated obstacles. The undetected or unnoticed stakeholder, in some cases, may be completely supportive of the issue or plan. However, in other circumstances, the undetected or unnoticed stakeholder, referred to as "snaildarters", may present resistance that can hinder or stop the organization from implementation. Such circumstances could create considerable chaos when the snaildarters existence comes as a surprise. However, through the strategic planning process "snaildarters" might be recognized and strategies implemented to mitigate their impacts.

1. Police Officers:

- A. Support of the technology will hinge on cost effectiveness.
- B. Will support the introduction of the technology if they can be assured there is some identifiable benefit to them in the form of work effort reduction.
- C. Will not support the project if they feel threatened (if they perceive the technology may be used against them in some manner).

2. Police Middle Management:

- A. Will support the introduction of the technology if there is a sense of cost effectiveness related to its use.
- B. Will support the application of the technology if there is a sense of increased safety to personnel in high risk situations.
- C. Will assess the strategic advantages offered by the technology when compared against other attractive or practical technologies.

3. Communications Personnel:

- A. Will readily promote the technology if it offers any advantage in the deployment of personnel and uncomplacates workload.
- B. Will require minimal training in use of technology.

4. Chief of Police:

- A. Will likely support efforts to introduce technology into the department if organization of effort addresses fiscal, organizational and officer safety concerns.
- B. Will involve the departments likely look for the mechanism which assures the broadest base of support.
- C. Will likely support if cost effectiveness can be proven.

5. City Council:

- A. Will be sensitive to issues related to expenditure. Justification sufficient to withstand constituent criticism over expenditure will be critical.
- B. Will support introduction of technology if they understand its benefits and can reasonably justify to constituents.
- C. Will seek participation in any exploratory groups examining benefits of technology (will want to be involved from beginning, but not to micro manage).
- D. Will support project if it reflects positively upon community.

6. City Manager:

- A. Will support if cost effectiveness can be demonstrated.
- B. Will support if technology has appeal to and use in other city departments. Would offer cost justification.
- C. Will be concerned with versatility of technology (What other city departments can benefit from the technology).

7. Community:

- A. Will not support if there is a sense the technology is frivolous.
- B. Will not support unless they can relate a personal gain to the use of the technology.

8. Business Community:

- A. May not support expense unless benefit can be related to their individual enterprise.
- B. Will look for broadest based application to offer most benefit and spread cost more effectively.
- C. May not support if expense is distraction from other projects with which they can more clearly identify.

9. Other Municipal Departments:

- A. May support if they can develop relationship with technology based on a sense of usefulness to their particular department.
- B. Will support if there is direct benefit to their department and they can share in the technology.
- C. Cost effectiveness will be an issue with other managers.

10. Technology Manufacturers:

- A. Will be hopeful in developing law enforcement as a market for their respective product lines.
- B. Will continue to refine product line to improve marketability.

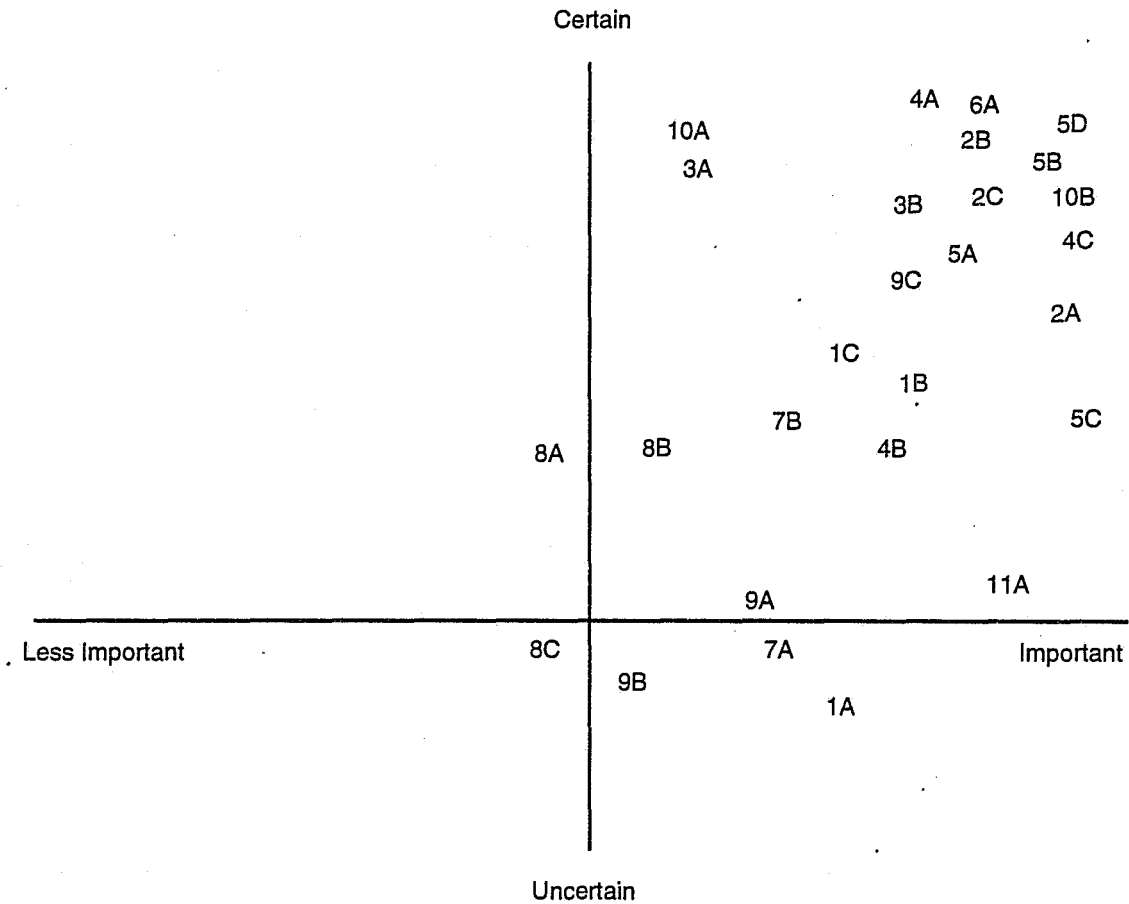
11. Defense Attorneys:

- A. Legal challenges presented that suggest an invasion of privacy dependent upon application of technology.

Relative to each stakeholder are assumptions that are made regarding the stakeholders possible position when associated with the issue. An assumption is defined, in part, as: a fact or statement (as a proposition, axiom, postulate or notion): taken for granted. Mapping of a stakeholders assumed position allows visualization of the position and it offers a field from which to understand the relationship of each stakeholder. Illustration 24, page 63, allows such an opportunity. Each stakeholder and their respective assumptions have been mapped by stakeholder number and assumption letter.

ASSUMPTION MAP

ILLUSTRATION 25



Stakeholders situated in the upper portion of the graph should be monitored by management. Those in the lower portion should have effective leadership and guidance from management to give them the direction necessary to cause a shift in their assumed position.

Strategy Development

In an attempt to arrive at the most appropriate strategy to achieve the stated organizational mission the author conferred with a small group of individuals to develop

alternative strategies. The group, facilitated by the author, was charged with the task of developing alternative strategies from which a preferred strategy would be selected to aid in achieving the mission statement. The methodology involved the modified Delphi process as previously employed during the selection and evaluation of trends and events.

The group consisted of the following:

Arthur Ritter, Captain, South Lake Tahoe Police Department.
Bobby Mabee, Sergeant, South Lake Tahoe Police Department
Pam Sullivan, Law Enforcement Technician, South Lake Tahoe Police Department

After an explanation of the purpose of the exercise and the anticipated results, the panel was charged with developing criteria that was specific to the issue (What impact will personal position location technology have upon the management and administration of mid-sized law enforcement organizations by the year 2000?) as a means of aiding in the evaluation of alternative strategies. The author provided a copy of the mission statement as crafted for this work, along with a summary of the stakeholders and their assumptions.

The panel then set about the process of developing several strategies that could be employed organizationally to achieve the stated mission. Through the Delphi process and the use of the criteria developed by the panel each strategy was considered and evaluated. The panel was then charged with the task of ranking each strategy. The two highest ranking strategies were then determined by the panel. Additionally, the strategy with the most diverse support was determined and added to the two highest ranking strategies.

The panel was encouraged to discuss the positive and negative aspects of the two strategies and how each strategy would be perceived by the various stakeholders.

Upon conclusion of the discussion the panel was asked to rank the three remaining strategies. From these final three a preferred strategy was selected to be employed to achieve the mission.

One of the strategies examined involved implementation via unilateral means. This strategy was not popular as it did not give the opportunity for consensus building nor buy in from the stakeholders. Consensus building was expressed to be very important.

While this particular strategy had the advantage of reaching a goal it did not fulfill the micro mission statement.

The second plan examined involved taking a passive role in the implementation process by letting others pave the way. This plan also did not offer any consensus building advantages and even worse it provided for no ownership in the future of the issue. While the group recognized the value of empowerment there was a strong desire to maintain some ability to influence decisions.

The selected strategy involved a process that was familiar and comfortable to the entire group. Of importance is the fact that those selected to participate in the exercise have a great deal of experience in and exposure to a organizational culture that espouses participative management. In 1991 the South Lake Tahoe Police Department formed a group of personnel, representative of the various facets of the department, which convenes monthly to participate in the composition of policy and long range planning for the organization. The group is known as the Participative Management Team (PMT).

The preferred implementation strategy included advancing the entire issue into the Participative Management Team (PMT) process as the most satisfactory method of assessing the desirability and value of the issue and mission. The PMT process allows the greatest number of stakeholders to share in the evaluation of the technology within the organization, in an environment that promotes the free exchange of expression, while focusing on an issue or issues. While there are no guarantees, it is held that if a topic or issue can achieve support in PMT it has a greater chance of success, as it has passed review by a representative group of the department. If PMT supports the issue there are built in organizational "champions" for the cause.

Should a issue or consideration be of a great magnitude, impacting others from outside the organization, it is common to form a task force or sub-committee, which could solicit participation of those from outside the immediate organization. The sub-committee or task force would involve elements of other stakeholder groups to allow input before further consideration or implementation. The sub-committee would then report to PMT with their findings. While a sub-committee might not have decision making authority it might well influence the outcome of an issue.

Through this process PMT would hopefully have a opportunity to make a more informed decision regarding the topic or issue.

It should be noted that in the PMT format the chief has the discretion of limiting PMT's role to advisory or can authorize PMT to make the final decision. Typically the chief will not abdicate his authority on issues that are regulated by law or political responsibility.

While the PMT process allows for the fullest examination and evaluation of a issue or program prior to implementation it can, if not provided a time table, be a distractingly

slow process. PMT methodology also includes that all decisions made by the body are made through consensus. All members must pass an issue favorably. In this arena consensus doesn't mean that all members must agree with the decision on an issue or project. It does mean that a participant senses enough potential benefit for the entire organization that that member can allow his/her reservations to be secondary to the common good of the organization. It should be noted that any one objection can prevent passage.

Implementation Plan

Once a decision has been made to proceed, based on interest and financial capability, a situational timetable for equipment acquisition, installation, orientation and training should be developed. Implementation should be conducted in phases and designed to move the organization from its present state to realization of the goal.

The following steps should be taken:

1. During this phase the goal of implementing the use of personal position location devices should be presented to the Participative Management Team (PMT). PMT should examine and evaluate the technology employing the PMT methodology to determine the technology has benefit to and a place in the organization. Providing PMT determines there is value in the technology a sub-committee should be formed consisting of representative stakeholders from within the department and city family. The sub-committee should be charged with the responsibility of meeting the goals of PMT relative to the adoption and installation of the technology.

Due to the fact the technology is highly sophisticated the members of the sub-committee should have multi-disciplinary backgrounds. The impact of the technology should be assessed and if there is a broad enough impact within the city structure members from other departments should be considered for inclusion on the sub-committee. The sub-committee should operate with guidance from a chairperson who is responsible for the day-to-day project needs and accountable to PMT for progress reports. That person should either be elected by the sub-committee or appointed by PMT.

Critical to this phase would be consideration of the elements required to be in place necessary to support the adoption of the technology. Additionally, devising strategies to deal with threats and weaknesses identified during the WOTS UP process should also be integrated. Equally important would be recognition of identified strengths and opportunities.

Communication will be a critical element throughout the entire project. However, communication will be critical during the initial phase of the project. Care should be taken to inform stakeholders of the projects development.

2. Educate sub-committee members as much as possible in the technology. This process might include demonstrations from various vendors.
3. Establish specifications for the bid process and publish a request for proposals. This process should include training considerations, maintenance and future upgrades.

4. Establish a budget to accommodate the project. This will require ratification from the city council. Funding sources will need to be identified. Whether from general fund accounts of special public safety revenue accounts.
5. Institute a process that requires periodic evaluations of the projects progress. This process should permit critical review in a timely manner.
6. Establish policy considerations and guidelines for use of the technology.
7. Be constantly vigilant of stakeholders and troubleshoot when and where necessary.
8. Site preparation for installation.
9. Training.
10. Post implementation troubleshooting and planning for the future.
11. Utilize the media to promote the progress of the project and develop the proactive attitude of the department and city as a whole.

This section has developed an implementation plan for the adoption of the use of personal position location devices within the South Lake Tahoe Police Department. The plan might well be converted, with minor adjustment, to implementation of any technology.

SECTION IV

TRANSITION MANAGEMENT PLAN

Description of Recommended Strategy

The recommended strategy involves developing a consensus based approach toward the implementation and use of small personal position location devices that are manually activated . When law enforcement field personnel are equipped with such devices, the equipment would not only advise the personnel of their location but could relay their exact location to dispatch, through the interfacing of GIS/GPS. This interfacing would allow for the speedy and accurate dispatch of assistance or medical aid.

The department involved in the evaluation is a medium sized California police department (South Lake Tahoe Police Department). In 1991 the department instituted a participative management style of management involving representation from virtually every facet of the department. Members are elected by their peers to serve two year terms. The Participative Management Team (PMT), which meets monthly, is a critical link between labor and management and aids in the short and long term direction of the department. PMT embodies a spirit of true cooperation and problem solving with focus on bottom up solutions. At the discretion of the Chief of Police, PMT may be a decision-making body or it may facilitate discussion with input in an advisory capacity. The Chief of Police reserves the prerogative to limit PMT's latitude so that PMT may have limited influence on issues of a political nature. The Chief cannot, should not and will not abdicate his authority in certain situations. However, this is understood throughout PMT and the department.

Decisions that evolve from PMT are reached by group consensus. Votes are not taken. Any participant may cause a matter presented to be tabled by choosing not give to consensus. However, even in the face of an individual concern, PMT members are guided by the principle that they must look beyond their own prejudices toward the greater good of the department and community.

Through the strategic planning process it was determined that the best approach in implementing a technological change would be through the PMT process. The project would be introduced to PMT members at a monthly meeting. The goal would be to develop enough interest in the project to have a task force or subcommittee composed to examine the technology to determine its application and feasibility to the department. The task force or subcommittee need not necessarily be comprised solely of PMT members. PMT bylaws allow for the participation of non-PMT members. Such latitude would allow for citizen and non-law enforcement technical support to lend their expertise. When considering implementing highly technical changes it might well prove prudent to involve a skilled non-partisan technician to aid in need evaluation and implementation, if such a person is available.

Upon review of the task force a recommendation would be made to PMT as a whole, to either proceed with, or without modification, or to abandon the project. It would be appropriate for the task force to complete enough research into the subject as to have a firm grasp on capabilities, expenditures, anticipated results and installation time tables.

This strategic plan was selected based on the fact that it allows the technology to be introduced and examined in a forum that is familiar and non-threatening to all personnel. Additionally, the selected strategy provides a venue for thorough examination, development of stakeholder support, financial feasibility (analysis conducted in-house)

and the potential for the PMT model being an model form of participative management for other agencies.

Stakeholder support that evolves from the PMT process naturally provides a sense of program ownership. Ownership will tend to offer a sense of defense should the implementation come under attack. The stakeholders should come together, united, toward a common desired future. Additionally, this type of approach should make it more difficult for a snaildarter to penetrate a weak spot and launch a subversive attack on the project.

Transition Management

Key to instituting a major change in how an organization operates is managing the transition from what is to what will be. The strategic plan previously outlined offers an effective introduction to managing the anticipated transition. However, in order to be effective, the transition phase must take into consideration how the stakeholders should be approached, along with their spheres of influence.

Transition management should also assess the stakeholders commitment or lack of it to the project and what level of commitment is necessary to achieve implementation.

Critical Mass

Definition: The minimum number of individuals or groups, originating from identified stakeholders, who must support a project or proposed change in order for it the succeed. In other words: The support of these individuals is critical to the success of whatever is being considered. Lacking their support the project is either doomed or significantly more difficult to institute.

In the strategic planning portion of this document the involved stakeholders were identified as the following: police officers, police middle managers, chief of police, communications personnel, city manager, elected officials, community, business community, other municipal departments, technology manufacturers and defense attorneys.

In identifying the critical mass, consideration was given to who the key participants are as determined during stakeholder analysis. Those identified as critical mass are the police officers, city manager, police sergeants, police mid-managers, chief of police, communications personnel, city council and information technology.

The critical mass was identified with the aid of two colleagues:

- * Scott Berry, Captain, Yuba City Police Department
- * Pam Sullivan, Law Enforcement Technician, South Lake Tahoe Police Department

Each person or group identified in the critical mass has a current position relative to the technology. The current position of each must be thoughtfully examined for the present position relative to the project. One must consider what level of commitment is required from the critical mass to insure success, and then a strategy must be devised to move the critical mass from their present location to the desired position, if movement is required.

Commitment Chart

The Commitment Chart (Illustration 26, page 73) identifies each member of the critical mass in the left column. The columns across the top identify various stages of commitment. Following each identified member of the critical mass is an illustration of

the level of commitment the respective member of the critical mass possesses at this point and the change that must occur to insure success.

COMMITMENT CHART

ILLUSTRATION 26

Actor in Critical Mass	Block Change	Let Change Happen	Help Change Happen	Make Change Happen
Police Officer's Association	x _____	_____	_____ o	
City Manager		x _____	_____	_____ o
Police Sergeants		x _____	_____ o	
Police Mid-Managers		x _____	_____	_____ o
Communications Personnel		x _____	_____ o	
Chief of Police			x _____	_____ o
City Council		x _____	_____ o	
City Information Technology Unit		x _____	_____ o	

X = Present O = Change

Influencing the Critical Mass

Police Officer's Association: The Police Officer's Association (POA) will be one of the key elements in allowing the change to occur. Likewise, the POA can block the introduction of the technology. Issues with the POA would include unnecessary surreptitious monitoring of their activities by supervisors. Additionally, they would express concern over funding being spent on technology when salary increases have been nonexistent over the past several years. However, their anxiety could most likely be reduced through understanding how the location devices work, and through the knowledge that they, the officers in the field, control activation of the devices.

Through the PMT process an advisory group might be established to monitor and resolve any problems that arise through the application of the devices. Any perceived

technical, procedural or policy problems could be brought to that forum and addressed. PMT provides an excellent mechanism for this purpose.

City Manager: The City manager plays a critical role in influencing the City Council. His history with the city has been that of an innovator, a change maker and appreciative of the benefits of technology. If he isn't directly involved in encouraging a positive change, he will allow it to occur if it is in the community's best interest. The City Manager has made it clear that, in his opinion, a substantial method of deflecting the effects of future budget cuts and maintaining or even improving operating efficiency is through technology. The motivation of enhancing efficiency while providing a safer environment for law enforcement will be a sufficient incentive to move the City Manager from letting change happen to making the change occur as it relates to this project.

Police Sergeants: The support of the sergeants is critical. They have the opportunity and access to influence the POA, even though they have their own bargaining unit. While they are not perceived as willing to block the project they may share some common concerns that influence the POA. The sergeants will frequently dissent along factional lines that, at times, are difficult to pre-identify.

Change is occasionally viewed with speculation and, as a group, they may be publicly supportive. Individuals may offer subtle contradiction to the position taken by the group as a whole. They might be motivated to help change happen if they sensed heightened security for their personnel, greater operating efficiency and a confidence in the knowledge the change would not impact them personally.

Police Mid-Managers: The middle management of the department is interested in the welfare of their personnel and those devices that will facilitate effectiveness and

efficiency. An enthusiastic interest from the middle management group could be very influential with the remainder of the department.

The participation of at least one member of this group will be a critical element in maintaining a management perspective in the project. The mid-managers work closely with policy and budget matters and their support would be invaluable.

Communications Personnel: The communications personnel will, in addition to the police officers, be the group most effected by the implementation of the technology. Their interest in understanding the project is important. The communications staff will be supportive if they believe the technology will enhance their positions and offer an, as yet, unattainable benefit to the department.

The communications staff is in an excellent position to help the change occur.

Chief of Police: The Chief is aggressively pursuing ways of fortifying the department in the face of diminishing fiscal resources. He sees the value of technology and automation and promotes both when appropriate.

His leadership and support of the project will influence a wide segment of the community and city structure. The Chief's movement from helping the project along to making it happen would not take much encouragement providing he can sense economic benefit to the department and city, increased safety, improved job efficiency, and a sense of positive impact on law enforcement.

City Council: The council plays a role in approving and funding the project. The

council has demonstrated an interest in technology as a way of fending off service level reductions created by prolonged reductions in the city's budget.

While the council's role has been that of a facilitating body which takes pride in providing the tools necessary to service the community in a efficient, courteous and professional manner. They recognize the value of employee involvement in matters that critically impact the employee. The council would posture itself to help staff achieve their goals.

Information Technology Unit: The knowledge and assistance of this city department will play a key role in advancing the technology in an orderly assimilation to within the city technological master plan. Their role would not necessarily need to be that of a change maker. However, the guidance this unit could offer would insure the smooth transition from the present to the future as it relates to computer related technologies.

Management Structure

With a management structure (PMT) already in place that tends to be of reassurance during transition, it may seem that all concerns might be aired through the monthly PMT meetings or subcommittee meetings. However, it would be advisable to have a project manager, known to all personnel, who can be sought out for situational problems. This person would serve as the overall coordinator for the project and might well be the PMT subcommittee chairperson.

This person would have been selected through the PMT process and would be empowered by that body with the agreement of the Chief of Police. Ideally this person should be highly motivated, but not necessarily a technocrat. Due to the size of the department it would be impractical to relieve this person from other duties to concentrate full time on the project. However, a realignment of priorities, with the

agreement of the Chief of Police, could prove helpful in creating some additional time necessary to manage the transition from the present to the desired goal.

A primary focus of the project manager/subcommittee chairperson should be on recognition of the role of the critical mass, their present level of commitment and the strategies necessary to bring them to the desired commitment levels. Being aware of and sensitive to the issues of the critical mass members will allow insightful, and perhaps timely, problem solving. Strategies can be devised in advance to deal with anticipated difficulties. This should leave a time buffer to deal with spontaneous problems.

The project manager/subcommittee chairperson should continue regular meetings with his/her subcommittee. This person must be empowered to work directly with technical and manufacturing representatives. The project manager/subcommittee chairperson should provide frequent and complete updates on the projects progress and be available to respond to inquiries.

Supporting Technologies/Methods

Managing change effectively often requires varied types of techniques and mechanisms in problem solving. While some of these systems are inherent to the PMT style of management others are not.

1. Communication: Frequent and descriptive memorandums from the PMT sub-committee, along with being available for personal contact, will permit all personnel to keep current with the progress of the project. In addition to keeping those interested updated such practices will tend to mitigate the

effects of rumors and go a considerable distance in reducing the stress associated with change.

2. Involving Others: By involving others in portions of the project, the project manager/subcommittee chairperson not only gets an opportunity to share the responsibility, but also seizes the opportunity to gain a heightened commitment from others as they become more involved in the project. This practice will also serve to dispel anxiety through association and first hand knowledge.

3. Accessibility: Personnel look for reassurance and leadership during transitional periods. It will be critical that the project manager/subcommittee chairperson be highly visible and accessible throughout the project.

4. Limit Other Major Changes: The effects of a major undertaking can be organizationally and personally draining. Consequently, care should be taken to put off other and/or non-essential changes until the completion of the project underway.

5. Recognition: One method of inspiring commitment is by having a methodology in place that provides recognition for those involved in and committed to the change that is being undertaken. The reward should be meaningful, inspiring and attainable to be an effective inducement. However, whatever the reward, it should be offered only upon sincere and effective effort.

6. Responsibility Charting: Responsibility charting is a discipline used to assess behaviors of individuals connected with the project in a series of tasks that are involved in bringing about the desired change. Responsibility charting fixes individual responsibility for certain tasks. It provides a road map for who has

responsibility and their level of responsibility, while at the same time eliminating duplication of effort. It may be insightful to provide each member of the project team a copy of the chart to insure that each understands his/her role and what role other team members play. Captain Berry and Ms. Sullivan assisted in the responsibility assessment. Vertical listings on the left of the chart describe the tasks involved. A list of the project team members is listed across the top horizontally. The following classifications are used: (R) Responsibility to see actions or decisions occur, (A) Approval of actions or decisions with a veto right, (S) Support of action but no veto right, (I) Informed of action or decision but has no veto right, and (-) Not Applicable to this item.

RESPONSIBILITY CHARTING

ILLUSTRATION 27

Actors/Tasks	Chief	City Mgr.	POA	Council	Communication Supervisor	PD Mid-Mgrs.	Project Mgr.	City Info. Tech.	Committee
Write Program	A	S	S	S	S	S	A	S	R
Est. Policy for Use	A	S	A	-	R	S	R	-	A
Coord. With Manufact'r	I	-	I	-	S	I	R	R	I
Coord. Installation	I	-	-	-	R	I	S	S	A
Acquire Funding	S	A	S	A	I	I	R	A	S
Est. Trng. Program	A	I	S	-	A	S	S	I	R
Train Personnel	S	-	S	-	R	A	S	S	S
Problem Solving	S	-	A	-	S	S	R	R	A
Upgrade Evaluation	A	S	S	I	S	S	A	R	A

R= Responsible A=Approval S=Support I=Inform -=Not Applicable

7. Phase Completion Reports: A report process that allows for critical review at the completion of each project phase will offer the opportunity to examine the problems that occurred, and how they were attacked and the extent to which each was solved. These reports should not be used to find fault with anyone. They may be used as a tool to examine the strategic approaches to problem solving that occurred during each phase of the project. Phase completion reports should be completed by those charged with a responsibility on the Responsibility Chart.

Transition Management Plan Outline

A Transition Management Plan Outline would serve as a tool to assist in organizing efforts. Realistic and attainable target dates should be established that can be met as close as possible. Each member of the transition management team should be provided a copy of the plan outline. They should use it as their personal guide for their phase of responsibility. The outline should address major anticipated events and be broad enough in time to allow for surprise events.

Phase I

Plan and Organize - Total 14 weeks

- A. Decision To Proceed - 4 weeks
 - 1. Presentation to Participative Management Team (PMT)
 - 2. Empower task force/subcommittee to analyze technology for usefulness with report on findings
 - 3. Selection of project manager through PMT with the approval of the Chief of Police
- B. Building Consensus, Commitment and Understanding - 4 weeks
 - 1. Build consensus within department through PMT process
 - 2. Develop consensus with critical mass through one-on-one discussions
 - 3. Analyze individual capabilities and readiness
- C. Vendor Selection - 6 weeks
 - 1. Coordinate announcement of project, establish specifications
 - 2. Announcement and bid process
 - 3. Award bid and execute contract
- D. Progress reporting system to insure goals are being met and difficulties identified and remedied, ongoing throughout entire project

Phase II

Implementation Preparation - 4 Weeks

- A. Site preparation - 2 weeks
 - 1. Hardware installation
 - 2. Coordinate software installation
- B. Training - 1 week
 - 1. Communications
 - 2. Uniformed and plain clothes personnel
- C. Equipment Test - 1 week

Phase III

Implementation

- A. All hardware/software operational - Week 18
- B. Demonstrations for city staff and community

Phase IV

Evaluation

- A. Review, Continuous
 - 1. Status reports for supervisors and management
- B. Upgrade and technology trend assessment

Section Summary

The preceding section guided the project through the delicate process of transition management. The reader was exposed to the circumstances of the projects transition from conceptual discussion to going on-line. The readiness and capability of the key players was assessed along with the level of commitment necessary to lift the project from the drawing board to actual use. The section concluded with an anticipated time table to use as a guide for the process.

SECTION V

CONCLUSIONS

The foregoing study provides the following conclusions to the sub-issues:

- * What impact will miniaturization have on the future of personal position transceivers?

Research conducted substantiates the fact that electronic devices miniaturize as there are technical and design advancements. In particular, Global Positioning System (GPS) receivers or personal position location receivers have become more compact as they have been revised. Once much more bulky and non-transportable, present day receivers are pocket size.

Automated Vehicle Location (AVL) systems, presently used for fleet vehicle management, transmit the location of vehicles equipped with GPS linked transceivers to computer generated Geographic Information System (GIS) maps marking the exact location of the vehicle within certain geographic areas. This technology has miniaturized and become more efficient.

AVL systems are merely an enlargement of the anticipated personal position location device. In order to achieve the type use as desired in this study the devices must become smaller.

Miniaturization will have a positive impact on the issue. As equipment becomes more compact it becomes more user attractive. Theoretically, it becomes more efficient. Miniaturization will promote the use of personal position location devices.

- * What impact will court decisions have on the use personal position location devices?

Clearly the courts could impact the use of personal position location devices as a means of monitoring a persons movement regardless of the well meant intentions. The study validates a thoughtful approach toward the design of a transceiver that can be turned on or off by the user in all but court imposed use.

Case law and current practice support the use of home electronic monitoring devices to monitor the activities of probationers and parolees. The use of a transceiver to accomplish the same mission would seem to be a parallel device. It is impractical to attempt to obtain a judicial opinion on the use of personal position location transceivers, as judicial decisions are determined on presented situational evidence. It would be impossible to hypothesize in the abstract.

- * What reaction can be anticipated from law enforcement labor unions if officers are equipped with personal position location transceivers?

The study indicates that, at least from a historical perspective, a reaction from law enforcement labor unions is a certainty. The nature of labors reaction will depend primarily on what assurances labor has that the technology will not be used against its members. Labor could have a significant impact if its concerns are not anticipated and addressed. The negative impact of this sub-issue question can effectively be mitigated through thoughtful policy considerations, consensus building and by simply designing the transmitter portion of personal position locator to be manually activated with an on/off switch or button.

The issue question:

- * What impact will personal position location technology have upon the management and administration of mid-sized law enforcement organizations by the year 2000?

Through the use of interviews and review of limited literature it becomes clear that if law enforcement administrators have the opportunity to employ the use of personal position location technology there are several areas concern.

The primary area to be addressed is in the arena of employer-employee relations. Care should be taken to insure line personnel understand the purpose and function of the technology. Administrators should make the effort to assure line personnel the technology is being used to aid personnel not penalize them.

Administrators will find it advantageous to involve all facets of the department impacted by the technology in determination to use the technology. A team approach would prove beneficial in the project from inception to installation and beyond.

Ongoing budgetary problems will effect service levels and methods of delivery for the entire decade of the 1990's, and perhaps beyond.

Technology, specifically in this case, personal position location technology, will play a greater role in the effective delivery of law enforcement services.

Recommendation

Law enforcement leaders cannot control the external forces that play upon their abilities to carry out the mission of law enforcement. They must be aware of these conditions and harness them to their advantage where possible. Through awareness and

knowledge administrators can harness the benefits of personal position technology for the efficiency and safety of their personnel.

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Appendix A

N.G.T. CANDIDATE TRENDS

1. Level of fiscal resources for funding of public agencies.
2. Level of organizational dependency on computer technology.
3. Electronic devices miniaturize through technological development.
4. Credibility issues associated with increased computer dependency.
5. Increased sophistication and miniaturization of tracking devices assist law enforcement investigations (i.e. Bait money in bank robberies).
6. Books and instructional material published via papers medium.
7. Sophisticated electronic devices manage prisoners.
8. Implant technology developing to become less evasive.
9. Degree to which electronic devices will diversify.
10. Increased dependency on video technology for evidence.
11. Level of telecommuting.
12. Educational focus on how to access information rather than teaching information.
13. Technological advances leading toward perception of privacy rights being compromised.
14. Database software advancement allows recall of three dimensional imaging in addition to floor plan views.
15. Reduced direct interaction between individuals due to technology.
16. Jail overcrowding reduced through technology allowing better tracking of sentenced and unsentenced persons.
17. Degree to which GPS will interface with other electronic devices.
18. Electric automobiles achieve greater consumer acceptance for local driving.
19. Cashless society.
20. Biological research to replace radio telemetry devices.
21. GPS transceivers provided to children to enhance locating if lost.
22. Continued installation of cellular phone cell sites coupled with decreasing costs for equipment and air time.
23. Broader use of automated vehicle location systems.
24. Degree to which cost of GPS technology drops to consumer.
25. Level to which public and private organizations will "flatten"..
26. Personal computers gain power and reduce in size.
27. Digital satellite links provide 2-way global personal communication coverage.
28. Degree to which virtual reality training methods will replace traditional methods.

29. Degree to which remote sensors will direct emergency responses.
30. Degree to which technology permits organizational "right-sizing"..
31. Level of conversion to interactive society.
32. Degree to which criminal element keeps pace with technology.
33. Judicial resistance to allowing personal tracking devices for various purposes.
34. Computer/electronic device/technology paranoia.
35. Level to which technology permits tracking of Alzheimer's patients.

Appendix B

N.G.T. CANDIDATE EVENTS

1. 8.0+ magnitude earthquake occurs in California.
2. Constitutional ruling effects use of personal position monitoring devices.
3. Destruction of GPS satellite system.
4. Law enforcement and military merge.
5. Shift of earth's axis.
6. Nuclear war.
7. Technological advancements make personal position location devices obsolete.
8. Unexpected technological development dramatically reduces price of GPS/GIS technology.
9. Missing child found due to personal position location device.
10. Economic failure of government.
11. Criminal element frustrates GPS/GIS benefit.
12. California splits into three states.
13. California law enforcement regionalizes into service areas (no local control).
14. Legalization of drugs.
15. Chief of police position becomes elected as opposed to appointed.
16. Satellite imaging technology becomes available to law enforcement.
17. Video phone service permits new police practices.
18. Law suit by police labor unions.
19. Accidental activation of personal location device(s).

Appendix C

Scenario Iterations

Scenario One - Nominal, Iteration 42

Events which occurred:

1. Event 6, January 1995
Unexpected technological development dramatically reduces the price of GPS/GIS technology.
2. Event 8, August, 1995
Missing child found due to personal location device.
3. Event 1, April, 1999
Constitutional ruling effects the use of personal position monitoring devices.
4. Event 10, July 1999
Satellite imaging technology becomes available to law enforcement.
5. Event 3, July 2000
8.0+ magnitude earthquake occurs in California.

Events which did not occur:

1. Event 2, Destruction of GPS satellites
2. Event 4, Lawsuit by police labor unions.
3. Event 5, A technological advancement makes personal position location devices obsolete.
4. Event 7, Economic failure of government.
5. Event 9, Accidental activation of personal position location devices.

Scenario Two - Normative, Iteration 28

Events which occurred:

1. Event 6, May, 1995
Unexpected technological development dramatically reduces cost of GPS/GIS technology.
2. Event 4, May, 1996
Lawsuit by police labor unions.
3. Event 3, November, 1996
8.0+ magnitude earthquake occurs in California.
4. Event 10, April, 1998
Satellite imaging technology becomes available to law enforcement.
5. Event 1, January, 1999
Constitutional ruling effects the use of personal position monitoring devices.

Events which did not occur:

1. Event 2, Destruction of GPS satellite system.
2. Event 5, A technological advancement makes personal position location devices obsolete.
3. Event 7, Economic failure of government.

Appendix C, continued

4. Event 8, Missing child found due to personal position location device.
5. Event 9, Accidental activation of personal position location devices.

Scenario Three - Hypothetical, Iteration 15

Events which occurred:

1. Event 3, July, 1995
8.0+ magnitude earthquake occurs in California.
2. Event 6, December, 1995
Unexpected technological development dramatically reduces cost of GPS/GIS technology.
3. Event 8, February, 1996
Missing child found due to personal position location device.
4. Event 1, December, 1998
Constitutional ruling effects the use of personal position monitoring devices.
5. Event 10, June, 1999
Satellite imaging technology becomes available to law enforcement.
6. Event 9, August, 1999
Accidental activation of personal position location devices.
7. Event 5, October, 1999
A technological advancement makes personal position location devices obsolete.
8. Event 4, December, 1999
Lawsuit by police labor unions.

Events which did not occur:

1. Event 2, Destruction of GPS satellite system.
2. Economic failure of government.