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**THE IMPACT OF EMERGING COMPUTER TECHNOLOGIES
ON FIELD INVESTIGATIONS BY LAW
ENFORCEMENT BY THE YEAR 2000.**

By
JAMES T. BUTTS, JR.

**Command College - Class XI
Commission on Peace Officer Standards and Training
(POST)**

**Sacramento, California
January 1991**

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This Command College Independent Study Project is a FUTURES study of a particular emerging issue in law enforcement. Its purpose is NOT to predict the future, but rather to project a number of possible scenarios for strategic planning consideration.

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 this Command College project are those of the author and are not necessarily those of the Commission on Peace Officer Standards and Training (POST).

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ABSTRACT

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Abstract

A futures study forecasting implementation of emerging computer technologies, whose application can significantly increase the field officer's ability; to identify persons contacted, to impact the supervision of probationers and parolees, and to conduct crime scene investigations. Policies are recommended and an implementation strategy is presented.

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JAMES T. BUTTS, JR.
COMMAND COLLEGE CLASS XI
January 1991

Executive Summary

PART I - FUTURES STUDY

Background: Violent crime in America is on an upward trend. Gang culture along with the drug dealing and violence that accompany it is being exported from Los Angeles throughout the nation. The conclusion of a study by the RAND Corporation opines that 10% of California's criminal population commits 60% of its violent crime. Filing rates in Los Angeles for felonies and misdemeanors presented for prosecution have dropped to 17% and 23% of all cases presented. The nationwide probation population has reached a record high growing 5.6% during 1989 to 2.5 million. The nation's parole population grew 12.1% during that year, reaching a record total of more than 456,000 parolees. There are 90,000 adults on probation for various crimes in Los Angeles County alone, of which 27,000 are classified 'high risk'. Arrests are made in only 17% of felony cases.

What Will the Impact Be On Law Enforcement by the Year 2000?: A nominal group panel developed five significant trends: (1) Computer Hardware Physiology - (Central Processing Unit Power/cost per megabyte of storage/display resolution), (2) Availability of Advanced Input/Output Devices and Computer Assisted ID -(Voice Recognition, fingerprint scanners, retinal scanners, etc), (3) Variety and Amount of Database Information Available to Field Officers, (4) Levels of Asset Forfeiture Funds Returned to Police Agencies, and (5) State Coordination of Database Standards (Transmission Protocols, File Formats, etc). Five events were rated highly likely to occur with significant impact on the general issue: (1) Fingerprint Classification and personal information Magnetic Striped

on drivers licenses, (2) Voice Recognition Technology Perfected, (3) Asset Forfeiture Sharing Laws Modified to Reduce Police Agency Shares, (4) ACLU or Others Attempt to Restrict Police On-Line Access to Consolidated Databases, and (5) On-Line Statewide Access to All Counties' Parole/Probation Databases Established. The trends and events were analyzed and policies to bring about a desired and attainable future were recommended.

PART TWO - STRATEGIC PLAN

Organizational Analysis: The Inglewood Police Department was analyzed to determine its organizational strengths, weaknesses and capacity to undergo change.

Policies: Modified Policy Delphi process was used to develop and select policy alternatives to be implemented. The following policies are offered: (1) Develop technology environment scanners within the police department. (2) Establish a law enforcement liaison/commission for emerging technology applications planning. (3) Encourage participation in Law Enforcement associations. (4) Obtain access to all information available in criminal justice system databases for field personnel by 1995.

Implementation Strategy: Stakeholders and their orientation on the proposed change were identified and analyzed. Strategies for negotiations were developed.

PART III TRANSITION PLAN

Policy Implementation: Responsibility, commitment and readiness assessments were completed for all members of the critical mass.

Transition Management: A transition management structure based upon the strategic management committee process in use in the Inglewood Police Department at present was suggested.

RECOMMENDATIONS

Law enforcement will have to work smarter as opposed to merely harder to focus in more on proven criminals, particularly those ordered by the court to be formally supervised through terms and conditions of probation. Law enforcement also needs to tap the productivity and efficiency to be obtained by using emerging technology for preliminary crime investigations.

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PROJECT BACKGROUND

INTRODUCTION

Contemporary law enforcement is staring down the loaded barrel of a formidable task. That task is to help stem the rising tide of lawlessness that is currently eviscerating the quality of life in urban neighborhoods across America. Uniform Crime Reporting (UCR) to the FBI allows crime to be tracked and compared across the United States. The current drug epidemic has combined with a deterioration of the social structure of many communities. This decay is evidenced by an increase in violent crime, and serious UCR crimes overall and criminal gang activity. The contemporary crime picture has caused police administrators to reflect upon how police resources are to be deployed.

There are more violent criminals in the nation today than ever in history, armed with a plethora of powerful weaponry. The FBI reports that violent crime rose 5 percent in 1989, even as law enforcement officers made 7 percent more arrests than in 1988. In the first half of 1990, big-city murder rates surpassed the number recorded in the record year of 1970 for that same six month period. In the first six months of 1990, reported violent crime increased by 10 percent over a comparable period in 1989.

There appears to be little correlation between the number of police officers a jurisdiction employs and the crime index

rate. As an example, Washington D.C. has the highest proportion of police representation in the nation when all of its peace officers are counted, 8.0 for every 1000 citizens.¹

"...police agencies throughout the world are entering an era in which technology is not only desirable, but necessary in order to combat crime effectively...."

*Matt Rodriguez Deputy Superintendent,
Chicago, Ill. PD*

¹ Criminal Justice Newsletter; *D.C. Police Department Called Nation's Most Inefficient*; (Jan. 2, 1991) v22 n1 p3(1)

However, its crime index rate for 1989 was 10,300 Part I crimes for every 100,000 residents. Contrast these figures with those of San Francisco (2.4 officers per 1000, crime index 9,020 per 100,000), which fields one-third the number of officers per 1000 residents and the dichotomy becomes vivid.

Crimes as heinous as the current wave of drive-by shootings in gang infested urban locales that often maim and kill innocent children, are accepted with a disquieting atmosphere of resignation and indifference.

We have entered a transition era between what is now referred to as traditional styled policing, and the emergence of community or neighborhood oriented policing.

Community oriented policing shows bright promise in allowing police officers to shore up shattered communities by placing officers into neighborhoods as role models, services brokers and law enforcement intelligence gatherers.

However, during the wait for communities to rally around the officers helping them to help themselves, the spiraling incidence of violent crime will have to be abated or at least held in check until it is determined whether or not this alternative policing strategy is the answer.

In September of 1988, during a presentation given at the International Police Exhibition Conference in London, England, Matt Rodriguez, Deputy Superintendent of the Chicago, Ill. Police Department stated..."*police agencies throughout the world are entering an era in which high technology is not only desirable, but necessary in order to combat crime effectively.*"²

Emerging computer technologies hold the promise to dramatically increase the effectiveness of field investigations as a crime deterrent and criminal apprehension tool. These investigations are conducted when an officer's suspicions are aroused and often lead to the arrest of wanted persons, or at the least can cause a capering criminal to go

² FBI Law Enforcement Bulletin; *Developing an Automation Plan*; (Dec 1988) p10

elsewhere to commit a crime.

More importantly, the use of emerging computer applications can increase the ability to monitor proven criminals, and positively identify all persons that field officers contact.

The use of automation tools can significantly lessen the number of persons contacted by field officers who leave the detention having falsely identified themselves; or were wanted persons (parole or probation violators, fugitives, etc) and were allowed to leave due to insufficient information or inconclusive identification. Being identified as having been in a particular area at a particular time, in and of itself, will discourage individuals contemplating criminal activity.

Police agencies nationwide have traditionally been slow to embrace emerging computer technologies. When a particular application is developed, police agencies usually trail the private sector by an average of five to six years. The applications impressed into service generally mimic their office automation counterparts found in corporate America. In most medium to large sized police departments, one will find automated records input/retrieval systems, automated jail and booking ledgers, automated investigative case management and crime analysis systems.

These systems have provided efficiency benefits for the agencies that employ them. In most cases, reams of paper are saved and discrete analyses are culled from massive amounts of data. However, it is interesting to note, that one of the primary users of this computer sifted information, the street police officer, (in 90 percent of the police agencies in California) can receive in-field information from these systems by voice channel or telephone only. As of June 1990, only one of every ten agencies responding to a California Department of Justice (Bureau of Information Services) questionnaire had Mobile Digital Terminals (MDT's) in all or part of their patrol fleet.

William L. Tafoya, a noted futurist at the FBI's National Center for the Analysis of Violent Crime in Quantico, Virginia, has determined that by 1997 state-of-the-art

technology will be routinely used in crime reduction.³

Fifth generation computer languages (expert systems) are expected to play a major part in fulfilling that prophecy.

Most technological innovations adapted by law enforcement to improve field operations were developed initially for use in the private sector as a means of fleet or inventory control. Such has been the case for two significant applications; mobile data terminals (MDT's) and automatic vehicle location (AVL).

The situation occurs essentially because police agencies are primarily dependent upon the city or county Management Information System (MIS) Departments for guidance in the application of new technologies. As knowledgeable as these individuals might be in the area of computer applications, it is rare for the MIS' designated liaison to the police agency to have a deep insight into the intricacies of the police function. It is even more rare for the police manager to possess a comprehensive knowledge of automated systems and software available. There exists no unified body of law enforcement managers to supply cohesive input to the computer industry representing their needs. Therefore, computer hardware and software applications that can enhance line level functions are not effectively explored. Products developed for police departments are basically retrofits of products designed for other disciplines.

This study will explore the data needs, databases available, and potential impact of emerging computer applications/technology on field investigations conducted by police officers in California.

³ William L. Tafoya, *A Delphi Forecast of the Future of Law Enforcement*, unpublished doctoral dissertation, University of Maryland, (Dec. 1986)

PART I

DEFINING THE FUTURE

STATEMENT

The first phase of this project explores, researches and analyzes the general issue using futures forecasting methodologies. Three alternative futures scenarios will be developed. Literature scan, use of the nominal group technique, and interviews with experts in the field have developed the information upon which the forecasts are based.

The general issue statement is: "*The impact of emerging computer technologies on crime deterrent field investigations by operations units of urban law enforcement by*

"As for the future, your task is not to foresee, but to enable it." (Saint-Exupery 1948)

the year 2000." The key terms in this statement are defined as follows:

Emerging Computer Technologies: Computer software or hardware innovations that are likely to be developed for field applications between 1995 and the year 2000.

Crime Deterrent: Actions taken which will remove a potential criminal from a crime opportunity or discourage the commission of a contemplated crime.

Field Investigations: Probes conducted by sworn law enforcement officers in the field during the course of their crime suppression and maintenance of order duties.

Sub-issues impacting the general issue were identified during the literature scan. These issues were:

- 1) What will be the financial implications of using emerging computer technologies?
- 2) What impact will using these technologies have upon the need for computer training of police personnel?
- 3) What impact will increased availability of information have on individual rights to privacy?
- 4) Will sufficient Criminal Justice Information System (CJIS) databases maintained to make technology implementation worthwhile?
- 5) Will CJIS databases maintained with sufficient file integrity that their data can be relied upon to make field level decisions?

All of these sub-issues were validated as significant by data discovered in the scanning process. Emerging computer technologies tend to be application driven. Once a technology is developed, it matures or is shaped primarily by the application that will yield greatest profit. These sub-issues highlight the need for law enforcement to place itself in a state of readiness to become a market force to steer the application of these new innovations.

There are issues to be determined that are subordinate to the foregoing that must be dealt with to properly explore the general issue. These are:

- 1) Can computer equipment which will allow improved access for field officers be downsized to be carried in the field or affixed in autos?
- 2) Who will coordinate the formats in which information is to be recorded to ensure file compatibility across the various component of the Criminal Justice System (Law Enforcement, Prosecutors, Courts, Probation/Parole)
- 3) What funding sources are available for the implementation of emerging technologies?

The typical police structure/organization is one that is hierarchy oriented and centralizes decision-making. During the 1980's, many departments have involved themselves in strategic planning and team building in an effort to tap the innovative ideas and initiative that is widely distributed throughout the organization.

Management endeavors to share information in a more comprehensive and timely fashion, with the exception of information sharing on a real time basis to field personnel. Officers in the field in 90% of California police agencies operate as satellites, tethered to the station (their primary information source) by a two-way voice radio.

All information that they will possess to do their jobs for the current tour of duty must either be contained in their clipboard, posse box, attached to the unit visor, or be received from dispatch. Communications serves as the information funnel from the various state and local databases to the officer in the field. A synonym for the word funnel is 'bottleneck'. Many times, officers make the decision whether to stop and detain someone for investigation by factoring in the anticipated delay they will encounter to receive air time to run a want/warrant check.

Officers make decisions to stop and detain based on hunches and street sense. The primary question whose answer determines whether or not a crime deterrent stop will take place is; "Is the potential for discouraging/uncovering wrongdoing worth the effort of the stop?" The time of day, location of the person, prior contact with subject, subject behavior, and the officer's knowledge of crime in the area all enter the decision process. The previously mentioned voice funnel que can tip the scale of 'stop' vs. 'don't stop' to 'ignore and keep driving'.

Officers in the field lack a fundamental and critical capability. That is the ability to positively identify persons contacted in the field. In cases where voice channels are tied up or the base station computer link to the state is down, many officers decline to complete field interview cards on subjects without identification, conjecturing that most people involved in suspicious activity will lie about their identity anyway. Subjects without identification can beat the current computer system by memorizing the name and date of birth of a friend with a similar physical description, or by using an alias that is not recorded by the Department of Motor Vehicles.

Probationers and parolees in violation of the terms and conditions of their probation are difficult for the field officer to impact for a number of reasons.

First, as with anyone else, a probationer or parolee can avoid being identified by giving a false name. If there is no probable cause to arrest and subsequently fingerprint, the subject's status might never be discovered. Even in the event of arrest, the subject will not be identified if his/her prints are not classified and run. For this reason, many subjects have multiple arrests jackets in local records bureaus.

Second, even if the subject gives a true name, his/her probation status will not be revealed unless the subject's arrest record is recorded in the Automated Criminal History file or Juvenile Automated Index.

Third, if the subject does divulge a true identification and reveals a probation or parole status, absent personal contact with a probation or parole agent with access to the subject's file, a verification of the subject's terms and conditions cannot be conducted.

Any consideration of increased data surveillance capabilities will be incomplete without reflecting upon the potential for unauthorized use of information and a process for maintaining the integrity of the records maintained.

THE SCANNING PROCESS

The following methods were used to gather, develop and evaluate information pertinent to the general issue:

1) A literature scan was conducted which included the following sources; magazines, books, grant applications and final reports, technical computer periodicals, newspapers, federal, state, and municipal publications, newsletters, seminars and exhibitions on the future of computer technology.

2) Seventeen years personal experience as a peace officer including 4 years experience as a command level officer and as the designated police automation planner with the Inglewood Police Department.

3) Attendance at the annual COMDEX technologies exhibition, and a site visit to Hillsborough County Florida Sheriff's Department to view personally their implementation of Mobile Data Terminals.

4) Personal interviews with subject matter experts.

5) Use of the nominal group technique (NGT). The technique takes advantage of group thinking to cross pollinate various subject matter expert backgrounds to develop candidate trends and events and assess their impact upon each other. The NGT group members included police professionals from three layers of of the Inglewood Police Department, a police chief/automation planner from a nearby jurisdiction, and an MIS director. Ten panelists participated in the NGT process.

METHODS: IMPLEMENTATION

The literature scan revealed little in the way of studies directly associated with the general issue. There is a plethora of literature available concerning computer technology and law enforcement. Papers and articles written on computers and police work focused on the abilities of computers to harness and sift through large quantities of information. There were several trade paper articles and one study was discovered that discussed the necessity for making data available at the field level. All of these highlighted the Mobile Digital Terminal as the medium for transmission, but made no reference for the need for biometric identifiers at the field level. The MDT is an excellent platform upon which to upgrade and refine to employ the types of technology available in the 90's. A substantial amount of information was found in technical periodicals concerning future computer technologies. The task was to narrow the field of topics for exploration.

The second method used to gather information was site visits. Site visits were conducted at the Los Angeles Police Department, and South Bay Regional Communications in Redondo Beach to view their Computer Aided Dispatch and MDT operations. A site visit to the Hillsborough County Florida Sheriff's Department was made to view their integrated

Computer Aided Dispatch (CAD) and *Kustom Electronics* mobile digital terminal operation.

Hillsborough County was unique in that voice traffic was used in less than 10% of data transmissions. Call dispatch, unit status, and officer to station E-mail were supported. None of the sites visited supported biometric identification in the field. South Bay Communications is a consolidated communications center that services the cities of Hawthorne, Gardena, Hermosa Beach and Manhattan Beach, all in California. South Bay Communications' system was intriguing in that it supports field access to automated information maintained by all the member agencies. A very significant component of the system is that it supports field level query of field interrogation files. Many of these cities have contiguous borders. To have knowledge that a person an officer stops for suspicious behavior, was stopped in a nearby jurisdiction under similar circumstances would encourage an officer to 'dig a little deeper' than he might otherwise have.

Finally, the NGT panel itself proved to be a research resource for personal interviews. The NGT also helped to narrow the focus of pertinent issues for this research. The nominal group generated 56 trends (Appendix 1) and 26 events (Appendix 2).

TREND SELECTION

A trend screening form was used to determine which 5 of the 56 trends generated would have the most relevance to the general issue under study. A five and ten year long range forecast was developed from the panel median scores. The five top trends ranked first through fifth were:

- T1 - Computer Hardware Physiology - (Central Processing Unit Power/cost per megabyte of storage/display resolution).
- T2 - Availability of Advanced Input/Output Devices and Computer Assisted ID - (Voice Recognition, fingerprint scanners, retinal scanners, etc).
- T3 - Variety and Amount of Database Information Available to Field Officers.
- T4 - Levels of Asset Forfeiture Funds Returned to Police Agencies.
- T5 - State Coordination of Database Standards (Transmission Protocols, File

Formats, etc).

TREND FORECASTING

All trends were projected against the present which has a value of 100 percent. Today's value was used to gauge the level of the trend five years in the past, as well as five and ten years into the future. The five years prior forecast asked the panel members to estimate; "Where was the trend?" The five and ten year future forecast asked for two different estimations. First a nominal forecast which asked; "Where would the trend be absent any intervention?", and a normative forecast which asked; "Where would the trend be if proactive forces were applied?" or "Where should the trend be?" The median values established by the group for each trend are reflected in *Table 1*.

Table 1

TREND EVALUATION

T R E N D S T A T E M E N T	LEVEL OF THE TREND (today = 100)			
	Five Years Ago	Today	5 Years From Now	10 Years From Now
T1 Computer Hardware Physiology Central Processing Unit Power Cost per Megabyte of Storage Size of Computing Unit	50	100	160 / 200	300 / 300
T2 Availability of Advanced Input/Output Devices and Computer Assisted ID Input Devices Voice Recognition Fingerprint Scanners Retinal Scanners, etc...	0	100	165 / 150	225 / 200
T3 Variety and Amounts of Database Information Available to Field Officers	65	100	125 / 150	175 / 200
T4 Levels of Asset Forfeiture Funds Returned to Police Agencies	0	100	125 / 200	110 / 75
T5 State of Coordination of Database Standards Transmission Protocols File Formats	25	100	125 / 175	150 / 175

Panel Median Forecasts



T1 Computer Hardware Physiology (Figure 1)

This trend analyses the power aspects of computing and where that power will take us over the next 5 to 10 years. In 1843, Henry L. Ellsworth, first commissioner of patents, warned Congress of the impending arrival of "that period when human improvement must end." Everything -- it was thought -- had already been invented.

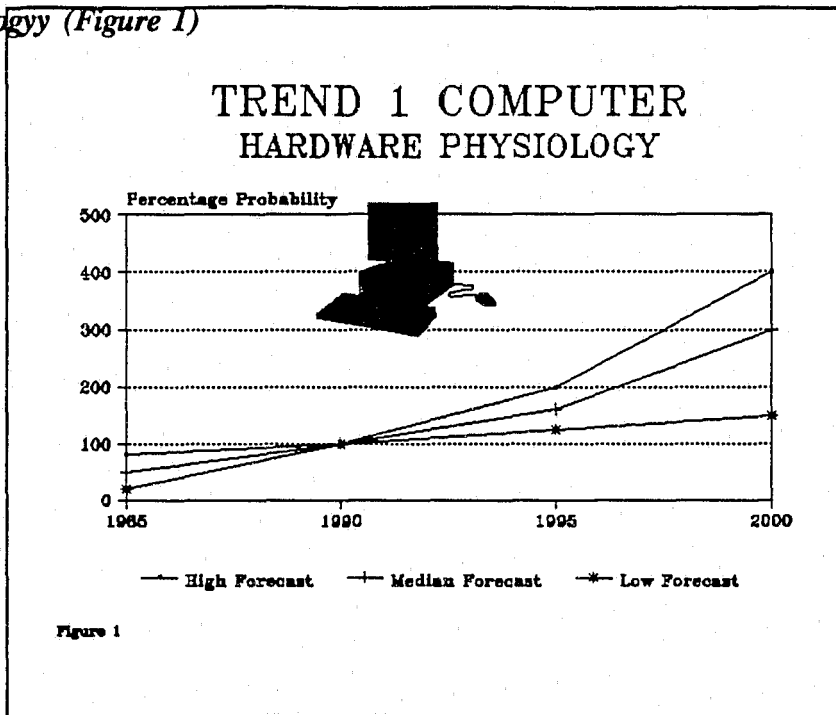


Figure 1

In the present world, new technology is being created so rapidly that even the newest breakthrough's are seen as transitional events.

According to Apple Corporation's Advanced Technology Lab director, Dr. David Nagel, over the past 10 - 15 years, computer memory has been increasing by a factor of four every three years (400% or an average of 133% per year). Mass storage densities (the amount of data that can be fit into a storage device of the same physical size) by a factor of two every three years (200%). Computing clock speed (the speed at which central processing units run) are going up 70 percent per year. By the year 2000, the power available in 1990's desktop computing machines will be available in devices the size of a thumbnail. The capabilities that a microcomputer sold in the year 2000 will possess are

contrasted with a comparably priced 1990's PC in Chart I.⁴

Chart I

	<u>1990</u>	<u>2000</u>
Random Access Memory (operating memory)	4 megabytes	1 gigabyte
Mass Storage (Permanent Memory)	100 Megabytes	10 gigabytes

What this means to law enforcement is that a computing device the size of the laptop computer currently used as a mobile terminal in Morgan Hill, California, will have the power of mainframes that handle the computing chores for a large county for about 3,500 1990 dollars. Conceivably, a pocket sized computer will have this power as well. This will allow the local use (in the field) of many processor and memory intensive applications such as voice recognition technology, experts systems (Artificial Intelligence applications), which at present are laboriously slow in any task of moderate complexity. Technology has progressed to the point that all the chips and circuitry contained in a workhorse 286 chip personal computer have been replicated on one chip the size of 1/2 inch by 3/4 inch. The field of "Nanotechnology" involves working at the atomic or the molecular level where measures of a ten thousandth of a micron are typical. Tiny computers are envisioned - smaller than flies or even bacteria.⁵ The technology would enable the production of 'Microrobots', potentially producing tiny robots that could attach themselves to thieves or suspects vehicles and allow police to track the suspects. Pressing an alarm button during

⁴ Wayne Hansen, Government Technology, *The Future of Microcomputing*, (Aug. 1990) p44

⁵ Newquist, Harvey; Computerworld; *Computers Smaller Than a Fly*; (Feb. 15, 1989) v22 n7 p19(2)

a robbery could release these micro trackers along with notifying police in the area.⁶

In addition, computers of the year 2000, are expected to be constructed to process data as humans do. At present, computers primarily do one thing at a time for each clock cycle of the processor employed. However, they do that one thing very fast and do not mind that consistent repetition is required. This makes them excellent for the sequential indexing, cataloging and searching for records in a large database.

Humans think and process problems in a parallel manner, with communication occurring between the neurons of the brain. Several processes are integrated into the resolution of a problem, which is why humans have the capacity to integrate a past experience into a current situation. This is how humans learn.

"Neural Networks" arrange hardware in patterns that closely resemble a biological system. It is predicted that by 1992, a talkwriter will be developed that will turn speech into text.⁷ Federico Faggin, founder of Synaptics, Inc. (San Jose, CA) and Gary S. Lynch, a neural biologist at the University of California at Irvine were awarded patent 4,802,103 which covers circuitry that can be taught to associate new events with ones that have been learned before. This system is an example of a neural network and is based on grids of programmable switches called 'floating gates'. Electrical charges stored in such gates increase as the gates are used, so that pathways to sensors become easier to travel and something similar to learning takes place.⁸

The concept of computer learning has positive implications for computer vision. The

⁶ Helm, Leslie; Los Angeles Times; *Big Hope for Tiny Machines*; (Jan. 6, 1991) pA1

⁷ Glazer, Hal; Software News; *Neural Networks: Software on the Brain*; (Nov 1, 1987) v7 n13 p66(3)

⁸ Andrews, Edmund; The New York Times; *Developing Brain-Like Computers*; (Feb. 11, 1989) v138 n47,778 p18(1)

computer of 2000 is expected to not only hear and recognize speech but to see as well.⁹ Imagine a computer partner that can watch a suspect for his human counterpart, and distinguish threatening movements from innocuous ones.

As we approach the millennium, the problem will not be the processing power available in the field, but the method in which data is transmitted to the officer. As car based computers proliferate, the same over-crowding that has occurred on voice channel could be expected to develop, albeit more slowly, on the channels designated for data transmission. It is anticipated that technology improvements will allow data to move at phone line speeds of 117,000 baud as compared to the current maximum of 4800 baud used in today's fastest mobile terminals.

A way to avoid the massive interchange of data through the air would be provide each police officer with as much of his/her data on a personal storage media to take into the field with him/her on a daily basis. Crime analysis data (trends and patterns) as well briefing and hot sheet information from all surrounding jurisdictions can be taken in the field as the officers clear briefing. The technology to accomplish this feat is already here.

Sony Corp. is developing a number of products for future release, including a device that fits in the palm of the hand and can search for data from a 3-inch CD (Compact Disc). The Data Discman, billed as an electronic book, weighs one pound and can store up to 100,000 pages of data.

This device could revolutionize the uses of writable-erasable CD's by making data as portable as music.¹⁰ Applying Dr. Nagel's projection of storage densities (400% evry 3 years) to this device would yield 600,000 pages of data on a three-inch Compact Disc. This is the metaphoric equivalent of carrying a small library in one's shirt pocket.

⁹ Andrews, Edmund; The New York Times; *Developing Brain-Like Computers*; (Feb. 11, 1989) v138 n47,778 p18(1)

¹⁰ Sanger, David E.; The New York Times; *Sony's Newest Portable is an Electronic Book*; (Jan. 29, 1990) v139 pC10(N) pD9(L)

T2 Availability of Advanced I/O Devices and Computer Assisted ID (Figure 2).

At present, the smallest and most powerful computer (equivalent of powerful desktops) are notebook size, approximately 8" x 11" x 1". The primary determinants of computer size at present are not the central processor (CPU) or

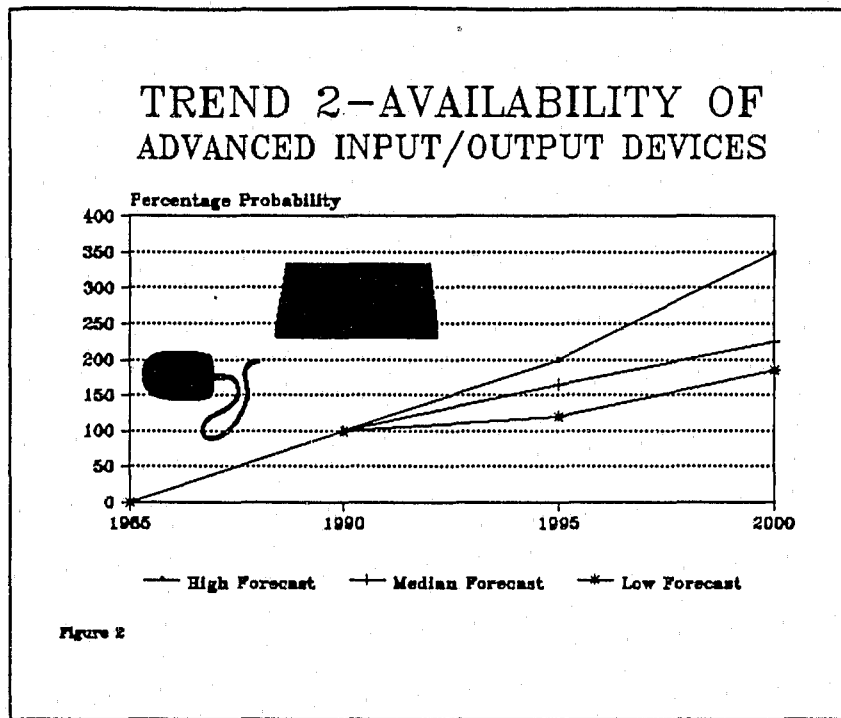


Figure 2

the storage devices. The methods of data entry (input) and data output now determine the size of computing devices. The keyboard and computer screen can only become so small or keyboards will become ergonomically unusable and display screens unreadable. The advent of active-matrix Liquid Crystal Display (LCD) panels will enable the production of flat screens no more than 1/4 inch in diameter with a resolution that meets the Video Graphics Array (VGA) standard. This technology places a single transistor at every pixel location and the visual contrast ratio is extremely high.¹¹ This technology will allow the placement of screen in the police vehicle that will take up minimal space, but provide the resolution to display digitized reconstructions of photos.

The computer keyboard on the other hand, has a form factor limitation of 11 inches and as means of data input in field situations is awkward and confining. The emerging technologies with promise for police field operations are; Voice Recognition, Infrared Eye

¹¹ Schmidt, Paul; Byte Magazine; *Guideposts for the 90's - Notebook PC's Set the Portable Standard*; (Dec. 1990) p154(16)

Movement (IEM), and Brain Response Interface (BRI).

Voice Recognition technologies fall into three major categories: Content processing, connection control, and software architecture. Content processing is the manipulation and analyzing of the payload of a voice channel. It includes voice channel digitization, digital signal processing, text to speech synthesis and speech recognition. Connection control is the process of setting up and manipulating connections between voice equipment. It includes telephone signaling arrangements and point to point command links. Software architecture is concerned with the organizing of computing system software and the creation of voice related applications.¹²

Interactive voice technologies, which include speech recognition, speaker verification, speech encoding and decoding and speech synthesis, permit the speaker to interact verbally with the computer. Interactive voice falls into the category of content processing. Within a few years, field capable products should be available. Phillips International in the Netherlands and Siemens AG in West Germany are collaborating on a voice recognition and synthesis machine that can respond to voice input from any speaker. The *Spicos 2 Siemens Phillips IPO Continuous Speech* system, created at the Institute for Perception Research (IPO) adapts to any speaker's voice after listening to the speaker say two sentences. The machine converses with users, asking them to clarify their intentions.¹³

Interactive voice offers a promising supplement to computer terminal security in the field. A speaker's own vocal chords can provide the key to a 'voice lock' that can be used in addition to or instead of a password system. Users at times may be unable to have their voices recognized due to a sore throat or other abnormality, however, back up systems that

¹² Strathmeyer, Carl; Computer; *Voice in Computing: An Overview of Available Technologies*; (Aug. 1990) v23 n8 p10(6)

¹³ Gosch, John; Electronics; *A Machine Talks Back*; (July 1990) v63 n7 p28(2)

would allow co-workers to authorize access could be made part of the system.

Finally, interactive voice provides an *emerging method of biometric identification*, the identification of people by voice patterns. *Voice ID most likely would be considered corroborating evidence only, however, it would definitely be a non-intrusive method to gain probable cause in the field for further detention and verification of identity.*

The difficulties in conducting field investigations of spanish speaking only victims and witnesses can be positively impacted by interactive voice technology. IBM Spain has opened its *Technological Center for Languages (TCL)*. The aim of TCL is to alleviate the problems that information systems have when translating large amounts of data from one language into another. The institute's focus has been on technologies that will facilitate information processing in Spanish with an emphasis on voice recognition.¹⁴

Fingerprint scanning and transmission of field scanned fingerprints is an emerging technology that has been pilot tested in two locations, Aurora, Colorado and with the Santa Barbara Sheriff's Office in California. The scanner system is manufactured by Fingermatrix, Inc. and is combined with an in-car facsimile machine that can receive facsimiles of mugshots. The objective of the unit is to identify a person by having him or her place a digit on the scanner. Transmission is then made by either cellular or radio frequency to a fingerprint database. Of greater use and emerging in the next 5 to 10 years is a portable compact laser print scanning device, which could be brought into crime scenes. As with current laser assisted print locating devices the purpose of this instrument is to expose prints invisible to the human eye. This machine would add a new wrinkle. It will scan and store the print in memory and then download the print to the police car host for transmission and identification. If a hit were made, DMV and other address yielding files would be automatically queried, allowing much swifter and more complete field investigations. Automated Fingerprint Identification Systems are continually proving

¹⁴ San Juan, Enrique; Datamation; *Systematizing Spanish Semantics*; (Sept. 15, 1990) v36 n18 p127(1)

their value. Early in December of 1990, 50 unsolved homicide cases from the year 1963 with fingerprint evidence were pulled from LAPD files. The AFIS identified a suspect in one of those homicides and the suspect has been arrested.¹⁵ Used in the field, officers could literally reach the suspect's home before the suspect would after a crime.

Retinal Scanning is a more intrusive biometric method of personal identification. To scan a retina it is necessary to focus a low power laser into the eye. 'EyeDentify' Inc. markets a eye capillary imaging terminal that is slightly less intrusive than retinal scanning. The EyeDentify 8.5 Terminal *is based on a digital camera* that takes an image of the blood vessel patterns at the back of a person's eye and converts the image into a code number which requires only 40 bytes of storage space.¹⁶ It is anticipated that this device in either laser or imaging form could reach the size of a fountain pen and be carried in an officer's pocket as a field investigation tool. The pen sized object could be inserted into a receptacle in the units host computer, which would download the scanned information from it and transmit the data to an eye scan database for comparison and identification.

Brain Response Interface - Future computers may use brain-wave recognition for input, resulting in a machine that responds directly to the user's thoughts. The Smith-Kettlewell Eye Research Institute has designed the Brain Response Interface (BRI), a system originally conceived as a way to help severely disabled people with poor vision. BRI divides the computer screen into rectangular boxes and an interface reads the subject's brainwaves to determine which box is being viewed. Many scientists are skeptical about the possibility of developing a true brain-wave interface because brain impulses are

¹⁵ Morrison, Patt; Los Angeles Times; *Computer Fingers Suspect in '63 Hollywood Murder*; (Jan. 4, 1991) pA1

¹⁶ Smithmidford, Robert; Federal Computer Week; *EyeDentify Focused Scanner on Security Marker*; (June 5, 1989) v3 n23 p30(1)

complex and change rapidly.¹⁷

T3 - *Variety and Amount of Database Information Available.* (Figure 3) A discussion of emerging technologies and their potential impact on field operations is of little meaning without reference to the work they will be used to enhance and the data that will be moved and processed through them.

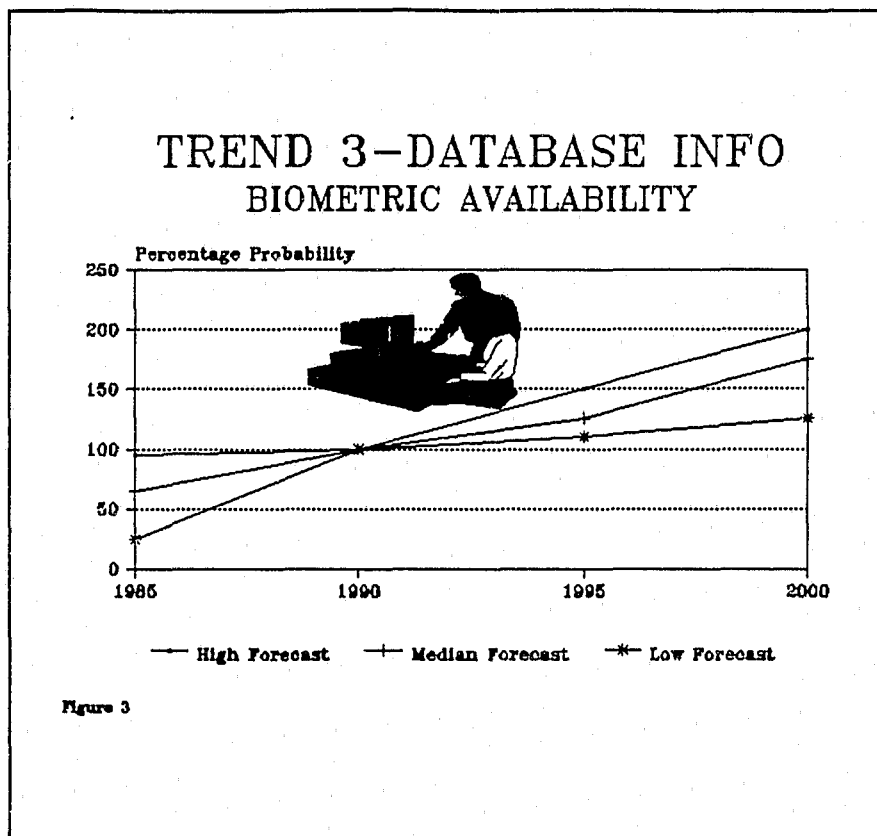


Figure 3

Figure 3

Law enforcement personnel have a need for certain types of information regarding people that they encounter in the course of their duties. A police officer who contacts an individual in the field seeks information about the person he/she has contacted to; (1) maintain officer safety, (2) determine if the person is wanted, (3) determine whether the person should be detained for more extensive investigation. An officer makes decisions based upon information that can be obtained rapidly.

Knowledge of the background of the individual detained allows improved decision making by the officer in the handling of a suspect. As an example, an officer would handle an individual observed loitering about a liquor store with greater caution, if the officer had

¹⁷ Helliwell, John; PC WEEK; *Glimpse of the Future; It's in the Mind's Eye*; (May 1, 1989) v6 n17 p17(1) 1989

knowledge that the subject was on parole for armed robbery. The criminal history of people confronted in the field is of vital interest and use to field officers.

In the state of California, police officers, through their communications dispatchers can access a variety of state maintained databases. The following databases are maintained under the umbrella of the California Law Enforcement Teletype Service (CLETS). The systems identified under the title of *Local Message Switchers* are provided in Los Angeles County under the auspices of the JDIC project. Details in Chart II, next page.

AUTOMATED DATA BASE INFORMATION¹⁸

Chart 2

NATIONAL CRIME INFORMATION CENTER (NCIC)

Vehicle File
Boat File
Article File
Wanted Person File
Federal Fugitive File
Missing Person File
Unidentified Person File
U.S. Secret Service File
Interstate Identification Index *
License Plate File
Securities File
ORI File

LOCAL MESSAGE SWITCHERS AND COMPUTER AIDED DISPATCH

Regional Warrants
County Warrants
Local Warrants
State Parole Data
Supervised Probation
Work Furlough
Sex, Narcotic, Arson
Registration
Crime Analysis Data
Bulletin Information
Field Interrogation History

Digitized Photographs **

* NOT AVAILABLE TO MOBILE TERMINALS

** TECHNOLOGY BECOMING AVAILABLE

CRIMINAL JUSTICE INFORMATION SYSTEM (CJIS)

Stolen Vehicle System
Automated Boat System
Automated Firearms System
Automated Property System
Wanted Persons System
Automated Criminal History System *

DEPARTMENT OF MOTOR VEHICLES (DMV)

Vehicle Registration
Driving Records
Automated Name Index

NATIONAL LAW ENFORCEMENT TELECOMMUNICATIONS SYSTEM (NLETS)

Administrative Messages *
All Points Bulletins *
Vehicle Registration
Boat Registration
Drivers License Information
Hazardous Material File
Aircraft Tracking
Aircraft Registration
Help Files
ORION
National Center Missing &
Exploited
Children

¹⁸ Department of Justice/Bureau of Justice Information Services Automated Systems Program - *Mobile Digital Terminal Project Findings* (Feb. 1988) p6

Over 70% percent of street officers do not have immediate electronic access to parolee and probationer data, even within their own jurisdictions. Less than 10% have immediate electronic access to data from other counties. Statewide, data on parolees and probationers is limited information contained in the DOJ Wanted Person System. If a wanted person has an active arrest warrant and that person is on probation or parole, the data will be entered with the warrant information.

Parole and probation information is available to police agencies in Los Angeles County through the County Warrants System (CWS). A person run for warrants that is currently on probation or parole will be identified as such if the supervising agency has entered the information.¹⁹ The FBI is asking Congress for \$80 million dollars to completely overhaul its NCIC database. The current system has been in place since 1968, and will process an estimated 364 million transactions in 1990. The NCIC databases listed on the prior page are available for query by local law enforcement. However, the FBI asserts that the current system is antiquated and has proposed the NCIC 2000 project. NCIC 2000 would add tools for in-depth analysis and would connect with a similar system in Canada.²⁰

Greater coordination and linkage of information needs to be accomplished. A critical component that is absent at the field level is the ability to identify persons *biometrically*. All the information contained in the current databases is of limited use if the subject detained cannot be conclusively identified.

The panel felt that database expansion in the near future would be in the areas of in field crime analysis information and the development of more types of biometric records. Individual police agencies maintain certain types of information that are primarily germane

¹⁹ Department of Justice - *A Survey to Determine the Need for New Data Bases in the DOJ CAL-INFO (CJIS) System* (June 1990) p7

²⁰ Robb, David W.; Computer Government News; *NCIC Takes Over Where Dick Tracy Falls Short*; (Oct. 15, 1990) v9 n22 p75(1)

to their own operation. Of this type of data, very important to the field officer is local crime analysis information. A few departments provide access to a rudimentary electronic bulletin board for briefing information. However, local or on-line access to comprehensive crime analysis data is not available for today's police officer.

Biometric identification devices use fingerprint, voiceprint, digitized signature, a scan of the retina or capillary pattern in the eye, or a facial scan to identify a person. The most reliable biometric identifiers with current emerging scanning technology are fingerprint and retinal scanning. As early as June of 1988, the California Department of Motor Vehicles had proposed to examine an eye-scanning technique that would allow the officer making the stop to query a proposed national registry of motor vehicles.

The motive behind the proposal was to stop the practice of interstate truckers of applying for licenses in various states and rotating them to avoid having previous violations detected. This proposal was part of the *Commercial Motor Vehicle Safety Act* passed by Congress in 1987, mandating that the states unite to form the *Commercial Drivers License Information System* to help enforce the one-person, one-license rule.²¹ The Federal Highway Administration announced that it was developing a pilot system in March of 1989. The project was put on hold due to the lack of technology available to provide the retina scan information to officers in the field.

The FBI plans an image transmission system wherein fingerprints and mug shots of fugitives can be sent directly to or from police units across the country. The FBI has completed a year long pilot system study with Fingermatrix Inc., a biometric security systems company. The pilot system featured a standard two-way police radio for analog image transmission. FBI officials intend for the system to be part of the NCIC 2000

²¹ PC Week - *To Identify Motorists, The Eye Scanners Have It* (June 28, 1988) v5 n26 pC30(1)

project.²²

Technology-wise, biometric identification requires the following: (1) voice, retinal, or fingerprint scanning or photo digitizing devices at the point of processing (Booking, Field Interview, Drivers License application, etc.). (2) Sufficient storage to contain the digitized recordings (these digitized images can require 50,000 to 100,000 kilobytes of storage each). (3) A method of transmission from the point of storage to the point of comparison or query. (4) A reader/scanning/transmission device at the point of comparison. For photo identification/comparison, a monitor at the site of reception that has at least Video Graphics Array (640 pixels x 480 pixels) resolution will be required.

The most reliable technology in the biometric identification field is still the fingerprint. However, fingerprints are useful only if the individual's prints have been recorded and linked to the individual. The current technology of rolling fingerprints in ink results in a significant error rate (non-classifiable prints). The FBI receives more than 17,000 sets of fingerprints each day, and according to Everett Stallard, (FBI fingerprints supervisor) about one of every three cards are of poor quality.²³

CAL-ID, a California state maintained fingerprint database contains 7 million prints, and can search for a match to a crime scene print in approximately 15 minutes. It conducts 280 searches per day and has recorded 30,000 matches. However, the process is still labor and time intensive by automation standards, because print card replicas are facsimiled to a location where they are manually classified. The digital corollary of the print is fed to the computer in a series of geometric equations that correspond to the configurations believed to be unique. A direct scan from computer to computer would be more efficient.

²² Rievenbark, Leigh; *Federal Computer Week; FBI System Would Exchange Mug Shots, Prints, With Squad Cars*; (Oct. 22, 1990) v4 n37 p12(1)

²³ Los Angeles Times - *System Overflows With Probationers* (Dec. 21, 1990) pA1

Just as the record industry has moved from analog reproduction of music through albums to the laser reading of compact discs, so too must we move to the laser scanning of fingerprints.

T4 - Level of Asset Forfeiture Funds Returned to Police Agencies. (Figure 4)

The panel felt this trend was very significant in that it was universally felt that the immediate and long term acquisition of emerging technologies would be dependent upon police departments' ability to pay their own way. Law enforcement costs continue to climb. In January of 1991, the California state

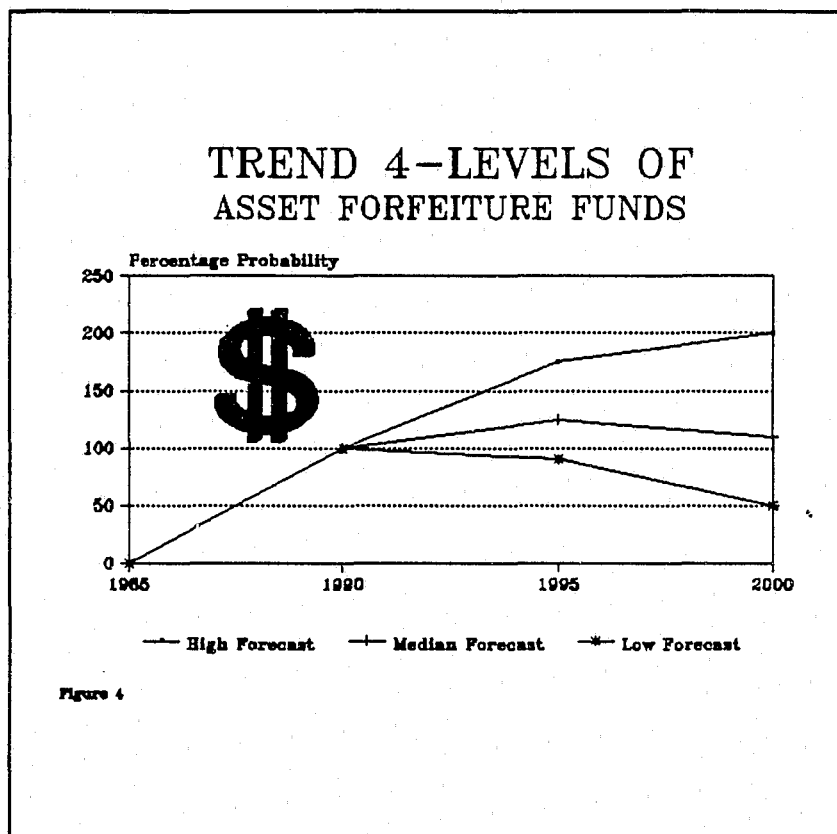


Figure 4

Figure 4

legislature enacted Senate Bill 2557 which authorizes county sheriff's departments across the State of California to recoup costs incurred for booking prisoners arrested by municipalities and boarded in county jails. Law enforcement is an increasingly litigious endeavor with settlements for wrongful police actions routinely awarded six and seven figure judgments.

The equitable sharing of seized narcotics funds and assets have proven to be both a Horn of Plenty and Pandora's box for the profession. Departments are investing their seized funds into computer equipment, helicopters, surveillance apparatus and other tools. However, a recent scandal involving the skimming of hundreds of thousands of dollars

prior to booking the monies, has resulted in the conviction of several local deputies, and the investigation of several more officers from other agencies. Investigators from the Federal Drug Enforcement Administration are being tried for narcotics corruption as well.

An added dimension to the asset forfeiture equation is the battle for decision-making control of the funds between some police chiefs and local city managers. Some chiefs complain that these funds are increasingly being used by City controllers to underwrite police expenses that should be funded from general fund revenues. There are two questions relevant to this trend. The first is whether or not asset forfeiture funds will be available five and ten years from now, and perhaps more importantly, what portion will be available for discretionary spending on State-of-the-Art (SOTA) technologies?

T5 - State Coordination of Database Standards (Figure 5)

The Department of Justice in California has been active and industrious in providing leadership in encouraging brainstorming and dialogue in the area of data consolidation and development of file formats for both MDT's regular sized (80 x 25) screen displays. DOJ has convened Mobil Digital

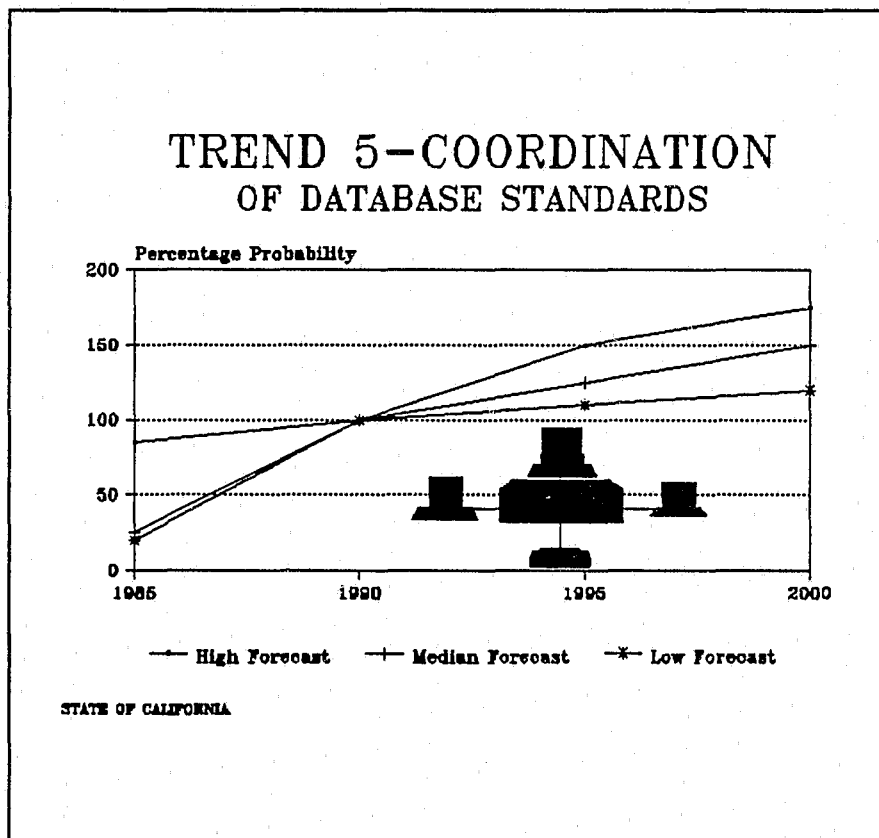


Figure 5

Terminal workshops periodically since February of 1988.

In June of 1990 the Department of Justice, Bureau of Justice Information Services

completed a study which surveyed law enforcement on the need for new databases at the state level.²⁴

The study makes strong recommendations that the State become the central link if not the repository for records for relating to probationers, parolees, registrants, Serious Habitual Offenders (SHO's), accident victims, persons in custody and persons the public is seeking to locate. The CAL-INFO system as articulated in the background section of this study (Police Field Investigations and Databases Available) is solid foundation upon which to include and link local databases. The State by necessity would become the arbiter of transmission protocols and file formats. Another factor to be considered is that the FBI's NCIC 2000 project will provide information through the State's CLETS system as it does at present.

EVENT SELECTION

In the letter of invitation to the NGT participants, sample events and trends were suggested to illustrate the difference between the two. During the meeting 21 events were added to the 5 suggested. The five most likely and with greatest impact on the general issue, based on consensus of likelihood of occurrence were selected for study. These events were:

- E1 Fingerprint Classification and Personal Info Magnetic Striped on California Drivers Licenses.
- E2 Voice Recognition Technology Perfected.
- E3 Asset Forfeiture Sharing Laws Modified to Reduce Police Agency Shares.
- E4 ACLU or Others Attempt to Restrict Police On-Line Access to Consolidated Databases.
- E5 On-Line Statewide Access to All Counties' Parole/Probation Databases Established.

²⁴ Johnston, F.W./Smith Jean; *A Survey to Determine the Need for New Databases in the DOJ CAL-INFO System*; (June 1990)

EVENT DESCRIPTION

E1 - Fingerprint Classification and Personal Info on CDL/Optical Stripe Card Stds. The Department of Motor Vehicles has announced its intent to introduce a magnetic striped drivers license by 1992. This is a very significant event. Although the magnetic strip concept has been in use by the banks as credit card information storage devices since 1980, it at least demonstrates a willingness to move toward automated technology in the field of driver identification. The Mag-Stripe DMV card will contain an electronic image capture of photograph, fingerprint, and signature. This is intended to be an eye-readable and machine-readable plastic drivers license/identification card. The central image database will be accessible through CLETS.

The panel expressed optimism that the implementation might be delayed long enough for '*Optical Stripe*' card standards to be developed. There are three major transaction card technologies with differing abilities and specifications. **Chart III** compares the emerging compact data storage technologies:

Chart III		
<u>DATA STORAGE TECHNOLOGIES COMPARISON</u>		
<u>MAGNETIC STRIPE</u>	<u>INTEGRATED CIRCUIT</u>	<u>OPTICAL STRIPE</u>
Widely used	Pilot Phase	Pilot Phase
2 kilobits	64 kilobits	100 megabytes
Memory only	Processor-Memory	Memory only
\$1/card	\$5-\$50/card	\$10/card
Readers-Low Cost	Readers-Low Cost	Readers Low-High Cost

The Optical Stripe has a huge advantage in the capacity for information (at present densities holds approximately 50,000 times more data) to be stored upon it. Potentially, the OS card could hold all the biometric identifiers (fingerprint, voice print, retina profile, digitized photo, digitized signature, etc.) of a person, along with serving as the only card a person would ever need. Medical records, bank information, probation/parole information and any other records germane to an individual could be stored upon this card with room to spare. The card could be cross-verified in the field by the photograph displayed on the face of the card or by field scanning of fingerprints or retina.

E2 - Voice Recognition Technology Perfected. The panel felt the key to agile field use of these emerging applications of technology is the perfection of interactive voice. Interactive voice input interface eliminates the majority of the training/familiarization issues associated with adding technological innovation into an operation. Interactive voice has the potential to drastically flatten the learning curve for the use of these identification and investigative tools.

E3 - Asset Forfeiture Sharing Laws Altered. The panel concluded that the recent scandals within the DEA and local law enforcement related to money skimming will generate great scrutiny on police operations directed at the seizing of assets. The panel feels that shares returned to agencies conducting enforcement operations strictly focused on the seizure of cash (reverse stings where officers offer to sell narcotics for example) may be drastically reduced to reinforce the emphasis on narcotics seizures as opposed to cash seizures. This of course will reduce the overall yield to police departments as the time span for the conversion of non-cash assets tends to be more lengthy and the outcome less certain.

Asset forfeitures were felt to be the best opportunity for law enforcement to become an economic driver in determining the initial applications of emerging technology.

E4 - ACLU or Others Attempt to Restrict Police On-Line Access to Consolidated Databases.

The panel concluded that these massively improved capabilities by the police to identify and locate citizens will be vigorously resisted by groups such as the ACLU and legislative bodies that they would lobby.

The concerns would stem not from the fear of effective law enforcement, but from the capability to monitor persons or groups not directly connected to criminal activity. In June of 1989, Rep. Don Edwards (D-Calif) at a hearing of the House Judiciary Subcommittee on Civil and Constitutional Rights in reference to the NCIC 2000 project stated;

"Advanced computer and surveillance technologies offer major advantages to the FBI in complex investigations....but (Congress) must pay close attention to this area because these powerful technologies makes increasingly pervasive forms of surveillance possible."²⁵

A paper published in May of 1988 by Roger A. Clark termed the process 'Dataveillance', a cross between data and surveillance. Clark writes;

"Personal surveillance is an important weapon in the fight against terrorism and organized crime. It is used to collect evidence in civil cases. It is also a means of learning sufficiently embarrassing facts about a person to assist in discrediting him or her in the eyes of some other persons or group. At its most secret, it can deny the subject natural justice, and at its most open, it can be tantamount to coercion or blackmail."²⁶

Clark notes that because so few contemporary identification schemes use a physiological identifier, they are therefore of only moderate integrity. Rather than the individuals themselves, what is monitored is data that purports to relate to them. As a result, there is a significant likelihood of wrong identification.

²⁵ Grimm, V.J.; Government Computer News; *Congress Keeps Eye on Computing in Investigations*; (June 12, 1989) v8 ISS: n12 p146(1)

²⁶ Clarke, Roger A.; Communications of the ACM; *Information Technology and Dataveillance*; v31 Issue: n5 Pagination p498(15) Publication Date: May 1988

Internal controls must be strong and designed to ensure a reasonable chance of detecting errors. In the law enforcement environment, timeliness and completeness of data relied upon by field officers is critical.

E5 - On-Line Statewide Access to All Counties Parole/Probation Databases Established.

The panel was unanimous in the view that proper supervision and control of proven criminals is absolutely necessary if we are to efficiently make inroads into the crime rate. This topic is discussed in depth in the study of **Trend 3** - Variety and amounts of database information.

EVENT FORECASTING

The five selected events were then evaluated to estimate the first year that the probability of the event occurring exceeded zero. The same was done for an estimate of the probability of the event's occurrence by 1995 and the year 2000 using a percentage scale of 0 to 100. The panel's median forecast was used in each area. Finally, the panel forecast the impact of the event on the general issue area, either positive or negative, using a scale that ranged from plus 10 to minus 10. The results are displayed in *Table 2*.

Table 2

EVENT EVALUATION

EVENT STATEMENT	YEARS UNTIL PROBABILITY FIRST EXCEEDS ZERO	PROBABILITY		IMPACT ON THE ISSUE AREA IF THE EVENT OCCURRED	
		Five Years From Now (0-100)	Ten Years From Now (0-100)	Positive (0-10)	Negative (0-10)
<u>Event #1 (E1)</u> Fingerprint Classification and Personal Information Recorded on Mag-Stripe on CDL's	2	80%	100%	9	0
<u>Event #2 (E2)</u> Voice Recognition Technology Perfected for Field Use	2	80%	90%	9	0
<u>Event #3 (E3)</u> Asset Forfeiture Laws Modified to Reduce Police Shares	2	70%	90%	2	8
<u>Event #4 (E4)</u> ACLU or Others Attempt to Restrict Police Access to Consolidated Data	0	70%	70%	0	8
<u>Event #5 (E5)</u> On-Line Statewide Access to Parole/Probation Info Established	2	75%	90%	9	0

Panel Median Forecasts

CROSS-IMPACT ANALYSIS

A Cross-Impact Analysis chart was completed by the members of the NGT panel. The Cross Impact chart estimates the impact of events upon events and events upon the studied trends. The scoring for impact of events upon events ranged from 0 to 6, with each number assigned a qualifying description of the likelihood of the impacted event occurring. The impact of an event's occurrence upon a trend was estimated in a range of -100% to 100%. A rating of -100% stops the trend and +100% doubles its intensity. A level or impact of 0% meant the event had no impact on the trend. The chart is reflected in *Table 3 (page 37)*.

The positive impacts of the individual events are summarized:

- E1** *Fingerprint Classification and Personal Info Magnetic Striped on CDL's.*
1. Increases the likelihood that advanced input/output devices will be developed.
 2. Increases the availability of database information for field officers.
 3. Increases the movement toward greater state coordination of databases.
- E2** *Voice Recognition Technology Perfected.*
1. Significant impact on the trend toward more powerful computers being developed to exploit the uses of the technology.
 2. Is a significant milestone in the trend of advanced I/O devices.
 3. Would have very strong impact on the amount of information available to officers.
 4. Will allow the state to more easily coordinate the formats in which data is relayed to field officers.
- E3** *Asset Forfeiture Sharing Laws Modified to Reduce Police Agency Shares.*
1. No positive implications, would have negative impact on the levels of asset forfeiture funds available to police for computer equipment.

E4 *ACLU or Others Attempt to Restrict Police On-Line Access to Consolidated Databases.*

1. Would have a negative impact on T3, the variety of data available to field officers.

E5 *On-Line Statewide Access to All Counties' Parole/Probation Databases Established.*

1. Slight impact on driving the availability of advanced I/O devices.
2. Strong impact on the variety of database information for field officers.
3. Increases the opportunity for the state to set database standards.

Table 3

CROSS-IMPACT EVALUATION

IMPACTING EVENT	IMPACTED EVENT					IMPACTED TRENDS					Actor Hits
	E1	E2	E3	E4	E5	T1	T2	T3	T4	T5	
E1 Fingerprint & Classification on CDL's	X	0	0	3	2	0	+10	+5	0	+5	5
E2 Voice Recognition Technology Perfected	0	X	0	0	3	+25	+25	+50	0	+35	5
E3 Asset Forfeiture Laws Modified/Reduce Police Shares	0	0	X	0	0	0	-2	0	-55	-5	3
E4 ACLU or Other Attempt to Restrict Police Access to Data	4	0	0	X	4	0	0	-35	-5	-15	5
E5 On-Line Statewide Access to Parole/Probation Info Established	1	0	0	3	X	0	+3	+20	0	+20	5
Reactor	1	0	0	2	3	1	4	4	2	5	X

IMPACT SCALES

<p>Events on Events: Percentage change (+ or -) or ...</p> <p>0 = No change 1 = Certain or virtually certain 2 = Much more likely 3 = Somewhat more likely 4 = Somewhat less likely 5 = Much less likely 6 = Impossible or virtually so</p>	<p>EVENTS on trends: Percentage change (+ or -)</p> <p>Policies on events: Same as event-to-event scale</p>
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FUTURES SCENARIOS

Based on the results of the study, three scenarios are presented for illustration of what the future could look like in the area of field investigations. The first scenario presented will be exploratory. This is the most likely future to occur absent planning or effort to impact the outcome. The second scenario presented will be hypothetical. This is a 'what if' scenario that hypothesizes a worst case outcome. The final scenario put forth for review will be a normative one. A normative scenario is a desired and attainable future. It presents actions and courses that can be taken/followed to put forces into motion to positively impact outcomes. This is the difference between shaping the future and having the future happen to you. The strategic plan and transition plans following these scenarios are fashioned to make the normative scenario a reality.

SCENARIO #1 - EXPLORATORY (LIKELY TO OCCUR)

Exploratory Scenario Year 1998

At the midpoint of the 1990's, there has been only incremental growth in the use of state of the art computer technology by mid and small-sized police departments in the state of California. Though greater funding for such projects is available because of increased participation in *Narcotics Asset Forfeitures programs*, most departments have opted to use those funds to increase sworn narcotics positions.

Voice Recognition technology was perfected in 1994, and *computers with the power of a 1990 mainframe are now the size of a cigarette package*. These pocket sized computers use a half-watt transmitter and can be linked to computers anywhere in the world by satellite. The primary clients of this technology are the Fortune 500 companies, as well as investment firms like Merrill Lynch. The oil companies have purchased the majority of these units. As usual, the developers of the technology have designed the applications for

it to fit the needs of their anticipated clientele, which does not include law enforcement agencies at this time.

The cost of the state of the art *miniaturized computer equipment* combined with a lack of insight to its utility causes many City Administrators and older police chiefs to view them as, "expensive police toys", that will not provide an efficiency return commensurate with the capital outlay required. Their feelings are well grounded based on their experience with a change in technology two years ago.

It was only back in 1996 that the Department of Motor Vehicles went on line with Mag-Stripe Drivers Licenses and PD's across the state outfitted their marked fleet with compact mag-stripe readers to use this 'new' system. Unfortunately, this good move came a little late. In 1995, the banks moved their credit cards to an optical stripe format that allows them much more flexibility for future innovations due the larger storage capacity. So now the only market for magnetic card readers is in the public sector. As with the expenditure for mobile terminals in the 80's, the 'new' technology was outdated approximately a year after implementation.

The reality is that even if purchases were to be made, there are no standards developed to allow anything but limited use of the equipment. A few well-financed and forward thinking departments have made purchases and are working with the Department of Justice to work out protocol and interface questions to access State databases and perform normal communications functions. With the power and potential of these machines, however, it's quite like chartering a 1990 F-16 Phantom to transport yourself to the grocery store. The lack of anticipation and cohesive planning for the foreseeable future has caused law enforcement to miss out on another technology cycle.

The community oriented policing efforts of many departments have made some impact in troubled neighborhoods. However, the lack of prison space has resulted in more paroles and sentences of probation for serious felons. The mag-stripe licenses are a great identification tool...provided that the person contacted is carrying one. As it was ten years

ago, persons not wishing to be identified give an officer a 'clean' alias, and absent probable cause for arrest...walks away unidentified.

SCENARIO #2 - HYPOTHETICAL (WORST CASE)

Hypothetical Scenario year 1997

Law enforcement in general has made some significant strides in coordinating access to the many separate databases used daily by field officers to conduct field investigations. However, the primary technology in use statewide is still the mobile data terminal of 1992, the last year that any departments entered the 'automation' era for their field forces. The Department of Justice has established and centralized access to the myriad of databases throughout the state.

In June of 1991, a confrontation in the Persian Gulf ended in nuclear confrontation as the United States retaliated with nuclear weapons after Iraq's Saddam Hussein unleashed chemical and biological weapons against American forces. The war destroyed 40 percent of the oil fields in the region, and resulted in anger and animosity towards America. Gasoline prices quadrupled over the next year as production levels were cut by a third.

This drastically increased the cost of operating a police department and combined with the reduction of asset forfeiture shares returned to local agencies (the legislature diverted a substantial share of the seizures to recreational programs, parenting classes, drug rehabilitation clinics), the monies to invest in high-tech had dwindled to nothing.

The high cost of operating automobiles decreased their value, however, the cost of gasoline made the crime of car theft for transportation purposes (joyriding) climb dramatically. Investment in improved in field computers would have allowed departments to tap into the Lo-Jack and Tele-Trac systems that were established in the 1980's.

SCENARIO #3 - NORMATIVE (DESIRED & OBTAINABLE)

It was 2:58pm, August 1, 1997, and Officer James Moncalvo was running late for 3:00 pm briefing. He slid into his seat with 30 seconds to spare. Briefings in 1997, are more concerned with strategy planning, idea generating, and more training oriented than the briefings of 1987 when Moncalvo came on. The extra patrols, crime broadcast information, wanted persons, and crime hotspots information are recorded on a lasercard that sits in a *read-write receptacle* situated in each officers locker during his off hours. Each card has a storage capacity of 1 gigabyte, and allows the officer to go into the field with a local database that includes 2 years of field interview information from departmental files, crime analysis and wanted information current to the minute the card was pulled from its storage receptacle, and any extra patrols or special details to be accomplished during the officers tour of duty.

After briefing, Montcalvo inserts the card into his combination personal computer, portable radio, and cellular phone. The device is 3" inches long by 2" inches wide and fits onto his utility belt with his other police equipment. A removable, flexible insert fitted in the collar of his uniform serves as a sensitive remote microphone that allows the officer to; communicate by interactive voice with the computer, talk on any of the department's radio frequencies, or make a phone call. The connection is wireless. A small, almost unnoticeable device, reminiscent of a miniature 1980's hearing aid, allows the officer to receive replies confidentially.

Montcalvo logs himself onto his unit by saying; "Montcalvo, serial #350, in-service." The computer replies, "Your voice pattern deviation falls outside the standards for acceptance, you must log on by means of the fingerprint reader in your police unit. Access to the information stored upon this lasercard is denied." The officer was recovering from a bout with laryngitis and expected trouble with the voice verification security check of the log on procedure. The system has several security measures burned in the chips that

operate the personal computer and the lasercard to prevent access by unauthorized users.

Montecalvo asks another officer, Officer Weinberg to assist him in a voice ID override. Weinberg states; "Weinberg, serial #432 requesting voice override for Montecalvo." The computer pauses briefly, and states; "Override approved, Officer Montecalvo logged in service." Montecalvo thanks Weinberg and responds to his unit.

Once he is within 10 yards of his unit, Montecalvo states; "Unit 317, access and checkout." His belt unit sends a signal to Unit 317's electronic processor, which unlocks the doors (similar to the auto alarms developed about 1989), performs an automatic check of the emergency and lighting systems and starts the engine. The unit's mileage, shop number, and date time checked out are recorded on both Montecalvo's laser card which serves as his personal log, and within the car's processor as part of the unit's permanent operating record.

Logs were last used by the department in 1995. When an officer makes a low risk stop, investigation or citizen contact, he states the pertinent information regarding the contact (location, reason) and the computer adds the time and duration of the stop, recording it on the officer's card. As an information backup measure, each time the officer re-enters the vehicle, an automatic download of the new information is transferred to the police unit's data storage unit which holds 2 gigabytes of information and when full, overwrites the oldest entry. Unit memory is consulted only in the instance of a lost card.

Even if the officer neglects to inform the computer that he has stopped and made a contact, the artificial intelligence program stored in the device's read only memory chips, can recognize that a recordable (by department policies) contact is occurring or has occurred. The computer then consults the police unit, which by way of the Intelligent Vehicle Highway System (first tested in Project Pathfinder in July of 1990²⁷) gives a location for the contact. The computer informs the officer at the conclusion of the contact

²⁷ Business Week (August 27, 1990) n3175 p84(1) 1990

that a log entry has been made and asks for a disposition statement. The officer cannot remove a computer logged event.

Montecalvo requests the beat profile information for today from the computer. The unit informs him by computer voice and simultaneously on the high resolution flat screen in the unit of the most pressing crime trends and serious recent crimes committed in the beat. Significant *premise history* information is presented automatically to an officer when a call dispatch is received, or when the officer initiates an investigation by voice recording a location.

A little after 10:00 pm, Montecalvo notices a tan ford two door sedan, parked in the alley just east of the PEP BOYS auto supply at Tammarck St. and LaBrea avenue. Montecalvo states; open channel, and computer activates his radio link to the dispatch center, while recording the pertinent information for his log. Montecalvo advises communications that he is going Code-6 (out for investigation) on a suspicious vehicle at the aforementioned location, for possible 459 (Burglary). Communications acknowledges, and as Montecalvo eyes the vehicle from a distance, the computer having heard the words, "PEP BOYS", "Code-6", and "459", searches the crime analysis information on Montecalvo's lasercard and informs him that there have been 5 burglaries and 3 robberies of PEP BOYS establishments in the South Bay over the past 6 weeks. In two cases, a tan sedan was seen in the area prior to the crimes, however, the suspects were not seen when leaving, so no direct connection was established.

Forewarned is forearmed and Montecalvo approaches the vehicle with caution. As he comes upon the car, suddenly, a subject who apparently was crouched behind the left front bumper stands up. Montecalvo asks what the subject is doing there and for identification. The subject says his name is Derrick Russell, but that he has no identification with him, and that he stopped in the alley to check his front tire because it felt like he had a flat. Montecalvo asks if Derrick has a license and Derrick sarcastically replies; "No, and it really doesn't matter now, because I'm not driving, am I..?"

Mr. Russell or whomever he is, has now sparked Officer Montecalvo's competitive interest with that snappy reply. The computer, hearing everything that Montecalvo hears (actually better) has just queried the Department of Justice file for Voice Prints and has received six potential matches. Three matches are for parolees, one for a wanted fugitive from Arkansas, and 2 for individuals on probation. Montecalvo asks Russell for his height and weight and the computer narrows the potential matches to one, Cedric Armstrong, paroled 4 months earlier in the year for after serving two years of a 6 year sentence for burglary and armed robbery of auto supply stores. Armstrong has AKA's of Eric Russell, Derrick Armstead, and Cedric Russell.

A backup arrives, and Montecalvo retrieves a portable fingerprint scanning device which is housed in the police unit. After the scan is completed, the stored information is sent to DOJ upon being placed back into the receptacle. The match is made and the computer lists Russell's terms and conditions of parole on the screen in Montecalvo's unit. One of the conditions forbids him to loiter in the area of auto supply or convenience stores after 6:00pm. The message instructs any law enforcement personnel contacting Armstrong in violation of these conditions to hold him until parole authorities are contacted.

Montecalvo takes Armstrong into custody, while simultaneously, his personal computer notifies DOJ of the confirmed stop and arrest. The information is sent in the way of an Electronic Mail message to L.A. County probation.

While enroute to the station, another unit has just completed an attempt burglary investigation of "Trac-Auto" auto supply store in the north end of the city. The suspect had gained entry, but apparently was startled away prior to taking property. A thumb and middle finger print were discovered on a pry tool left behind. They matched Armstrong.

PART II

STRATEGIC MANAGEMENT

STATEMENT

A potential desirable and attainable future has been articulated in the preceding pages. A strategy will be presented to move toward the realization of that future or one that is close. Strategic management is a process of resource allocation and key actor persuasion to move toward goal accomplishment. The process recognizes that the future is an uncertain quantity, but the underpinnings of the concept stress the belief that the future can be impacted.

The strategic plan is much like a road map in time for an organization. It sets direction and defines policies in support of goal achievement. In this paper the strategic plan will identify the stakeholders in decisions affecting this desired future, present policies for consideration, and provide a framework for the change process. Because there are relatively few very large police agencies in California, a medium-sized agency, the Inglewood Police Department was chosen as the implementation example.

METHODS: IDENTIFICATION

The following methods were used in the strategic planning process;

1. An analysis of the agency's strengths and weaknesses, along with threats and opportunities that exist in the internal and external environment were conducted.
2. A macro mission statement and micro (general issue specific) mission statement were constructed.
3. A modified policy delphi was conducted to evaluate and select viable and desirable policies to bring about the desired outcomes.
4. The S.A.S.T. technique (strategic assumption surfacing technique) was used to identify and assess key stakeholders in the change process and their positions

relative to the policies proposed.

5. Negotiation strategies were developed for the various stakeholders.

METHODS: IMPLEMENTATION

The Inglewood Police Department (IPD) is representative of many medium sized police agencies in the state of California. The policies developed by the analysis that follows could be transplanted and implemented by other agencies of smaller and larger size. Subject matter experts either employed by or familiar with the operations, strengths and weaknesses of the department analyzed and evaluated information collected and rendered their assessment of its implications to the IPD. This group consisted of one IPD lieutenant, one civilian manager, two IPD sergeants, and three line officers. This group collaborated and assisted in the development of a picture of the environment in which the IPD operates. They also assisted in the formation of the mission statement and the development of policy options. (*Appendix 3*)

SITUATIONAL ANALYSIS

The WOTS-UP method was used to conduct the situational analysis of the internal capability of the department as well as the environment external to the agency that impacts its ability to engage in positive change. WOTS-UP measures the Weaknesses, Opportunities, Threats, Strengths, and the Underlying Planning involved in policy implementation. The analysis provides an estimate of the department's ability to capitalize on opportunities and to diminish or elude identified threats. These are the results of the analysis:

1. **Strengths**: The Inglewood Police Department is a full service police agency with ten specialized assignments (S.W.A.T., Anti-Crime Team, Transit Safety Team, Gang Intelligence, etc) in addition to uniformed patrol duties. The Department has civilianized many positions formerly held by sworn personnel, and has made concerted efforts to

provide a lateral promotion ladder for non-sworn entry level clerical personnel. The City Council, Mayor, City Administrator and his staff in most instances are very supportive of proposals to strengthen and improve police operations and service delivery. Twenty officers were added to the Department between 1989 and 1990 to staff an assessment district funded Anti-Crime Team (ACT) whose enforcement focus is drugs and gangs.

The Department enjoys strong support from community leaders, the business community, service clubs, and the community at large. The City is approximately 9 square miles in size, but boasts over 275 neighborhood watch block clubs. Inglewood PD services the youth of the community through its allocation of officers to the Drug Abuse Resistance Education (D.A.R.E.) program and its oversight of a Police Activities League (P.A.L.) which provides structured sports activities to about 500 children each day.

The Department rewards personnel that show creativity, innovation, loyalty and energy while performing their duties. The path for success is articulated to all. Overall, the Department is staffed with good employees. Managerial development and competence are strong objectives of the agency. The Department has a generous training budget and believes in training all its employees. A 4-10 plan is worked in Patrol only. The agency has a strong Field Training Officer (FTO) program and is in the midst of developing a 5 and 10 year strategic plan.

The IPD has some personnel with high levels of technical expertise and insight in the fields of communications equipment, computers and emerging computer technology.

The Department's administration and Police Officers Association enjoy a refreshingly unique relationship. That relationship is characterized by high levels of communication, trust, and a sense of partnership focused on improving the agency and its level of service to the community.

2. **Weaknesses:** The Department has increased in size by approximately 75% since the police facility that houses it was built. Employees work in a very cramped work environment. An architectural firm has done a space needs assessment that recommends more than doubling the square footage of the facility. Negotiations are in progress to purchase a building that can be modified to meet the need.

The policing environment of the City is a challenging one. There are areas in the City where single family homes appraise in the \$500,000 to \$600,000 range, and then there are high density multiple-unit dwelling areas where street sales of narcotics proliferate and gang activity is intense. These sections are bordered by the City and County of Los Angeles on three sides. Rival gang members driving through Inglewood tend to prey upon the more passive Inglewood gang members, sometimes leaving in their drive-by wake a homicide victim.

The Department has been unsuccessful in selling the City Administration on the plunge into high tech computer interface field equipment. Personal computers proliferate inside the agency, the Deputy Chief and his Planning and Analysis sergeant serve as the Automation Planner and Manager, respectively. A local area network (LAN) is installed and being debugged. The LAN provide a gateway to two mainframe computers. The City's management understands the mercurial nature of emerging technology and fears that an impetuous plunge into the field interface technology could prove to be money wasted in a very short term.

The agency likewise has been unable to acquire funding for a helicopter program that it feels would positively impact field operations and produce stronger feel of police presence in the community.

3. Threats: After seven years of successive Part I crime decrease since 1981, serious crime has risen the past two, in 1989 and 1990. The expense of either remodeling the old station or purchasing and remodeling another building drains funds that potentially could improve the Department's technological capabilities. A rapidly increasing Hispanic population and dearth of spanish speaking personnel pose future threats for effective service delivery.

4. Opportunities: A potential annexation of a county area to the south of the City has the potential to increase the size of the Department and perhaps provide funding for equipment improvements. The City staff is aggressively working to continually improve living conditions, the image and pride in the City. The City received the "All-America City" award for 1989. Continual redevelopment efforts financed in part by grants received by

the City to alter land uses of aircraft noise impacted areas, has positive implications for renovation of blighted areas under the flight path to the Los Angeles International Airport.

The City is a major entertainment center, being home to both the fabulous Forum, home of the Los Angeles Lakers, and the Hollywood Park Race Track.

ORGANIZATIONAL CAPABILITY/RESOURCE ANALYSIS

An internal survey was conducted by the writer of select Departmental personnel, both sworn and civilian, to estimate the IPD's strengths and weaknesses (Chart 4) and the ability of the Department to react to or initiate change (Chart 5).

Identified Organizational Strengths:

- | | |
|-------------------------------------|--------------------------|
| 1. Equipment (quality and quantity) | 6. Community Support |
| 2. Management Skills | 7. Sworn/Non-Sworn Ratio |
| 3. Police Officer Skills | 8. Benefits |
| 4. Mayor's Support | 9. Turnover (Low) |
| 5. Community Support | |

The Department is perceived by the raters as possessing the skills, abilities and competencies to carry out its responsibilities. Personnel are well-equipped, supported by the Council, city staff and the agency has a stable personnel population. Managers and line officers are perceived as skilled and competent.

Identified Organizational Weaknesses:

1. Calls for Service

2. Training

It is perceived that the extremely heavy calls for service load and the Department's preoccupation with rapid response detracts from the ability to proactively deploy to attack crime problems. A perception exists that the high workload does not allow employees sufficient time to attend *off-site* training which serves some officers as a stress reliever.

Chart IV

Chart IV CAPABILITY/RESOURCE ANALYSIS						
Please evaluate each category item based on the following criteria:						
	I	II	III	IV	V	
I	Superior/As good or better than any other PD/Beyond present needs					
II	Better than average/good to Satisfactory performance/No problems					
III	Average/Acceptable performance/Not good, not bad					
IV	Problems apparent/Situation not as it should be/Deteriorating					
V	Situation serious/Approaching or at crisis/Immediate action required (The noted ratings reflect the <u>median value</u> established by the group)					
<u>CATEGORY</u>	I	II	III	IV	V	
Personnel Adequacy			X			
Technology			X			
Equipment		X				
Facility				X		
Calls for Service			X			
Response Time			X			
Management Skills			X			
Police Officer Skills		X				
Supervisory Skills			X			
Training					X	
Attitudes				X		
Mayor's Support			X			
Council Support			X			
Community Support		X				
Sworn/NS Ratio			X			
Pay			X			
Benefits			X			
Turnover			X			
Sick Leave Rates			X			
Morale			X			
Promotional Opportunities			X			

Chart V

CAPABILITY/READINESS FOR CHANGE - ANALYSIS					
Each item was evaluated for the type of activity encouraged.					
I. Parochial/Gustodial - Reject Change.					
II. Production - adapts to minor changes.					
III. Marketing - seeks familiar change.					
IV. Strategic - seek related change.					
V. Flexible - seek novel change.					
The noted ratings reflect the <u>median value</u> established by the rating group.					
<u>CATEGORY</u>	I	II	III	IV	V
<u>Top Managers</u>					
Mentality				X	
Skills/Talents					X
Knowledge/Education				X	
<u>Organization Climate</u>					
Culture/Norms			X		
Rewards/Incentives			X		
Power Structure				X	
<u>Organizational Competence</u>					
Structure			X		
Resources			X		
Middle Management				X	

STAKEHOLDER ANALYSIS

The *Stakeholder Analysis* looks at individuals and groups that are impacted by your actions, impact your actions and care about what you do. A person who on the surface would not appear to fit the profile of a stakeholder, but upon deeper analysis does, is termed a *Snaildarter*. A *Snaildarter* is an unanticipated *Stakeholder*.

The following list was developed by a brainstorming session involving the same members of the group referenced under the *METHODS: IMPLEMENTATION* section. It lists individuals and groups internal and external to the law enforcement community that

have a definite interest in the general issue and the enabling of it. They would be impacted by the implementation of emerging computer applications in the conducting of field investigations by operations units by the year 2000.

Significant Stakeholders

1. Mayor and Council
2. City Manager
3. Police Officer Association
4. Citizens (Residents)
5. Police Command Staff
6. Department of Justice
7. Computer Industry
8. MIS Director
9. Other City Department Heads
10. Line Officers
11. Business Community
12. Probation/Parole

**STRATEGIC ASSUMPTION SURFACING TECHNIQUE
(SAST)**

For policy development purposes, insight into the concerns of significant stakeholders will result in more insightful policies that facilitate implementation. Stakeholders view the principal issue in a perspective based upon their own self-interests. Graph 1 plots the results of the Stakeholder's Assumption Analysis. The graph charts the Stakeholders' assumption in relation to the central issue on two axis. The X-axis represents the Stakeholders relative importance to the organization and the general issue. The Y-axis plots the degree of certainty that the assumption is accurate.

Engaging in the SAST recognizes the importance of external drivers in the police department environment, and reduces the tendency to plan and strategize as though an agency operates in a vacuum.

ASSUMPTIONS

Mayor and Council 1

- ⊗ are concerned about citizen reaction.
- ⊗ want increased law enforcement efficiency and increased public safety.
- ⊗ want a progressive and modern police agency.
- ⊗ will want to be sure that the investment in technology is fiscally prudent.

City Manager 2

- ⊗ is concerned about public safety and the perception of safety in the community.
- ⊗ is concerned about technological tyranny (High tech -Low touch/Technology dictates service methods).
- ⊗ wants to make a wise capital investment/No investment in soon to be obsolete equipment.

Police Officers Association 3

- ⊗ supports officer safety improvements.
- ⊗ supports efforts to modernize department operations/status & skills of officers.
- ⊗ wants to improve the progressive, proactive image of the Department.

Citizens (Residents) 4

- ⊗ want a safer community.
- ⊗ have indicated a willingness to pay for an increased level of police service.
- ⊗ are very pro-police.

Police Command Staff 5

- ⊗ is committed to providing high tech/high touch service.
- ⊗ supports technological innovation.
- ⊗ feels that technology in long term will improve efficiency and effectiveness of field forces.

Department of Justice 6

- ⊗ encourages the use of on-line in-field database inquiry tools.
- ⊗ is attempting to play a coordination role in database consolidation.

Computer Industry 7

- ⊗ has an economic interest in the development of economically profitable applications.
- ⊗ will develop applications only for markets with clear potential.

MIS Director 8

- ⊗ is extremely supportive of the automation of field operations.
- ⊗ has bright senior staff.
- ⊗ is willing to tackle tough projects.

Other City Department Heads 9

- ⊗ are concerned that the Police Department gets too much of the fiscal pie. (More funds that go to the police, less for other departments.)
- ⊗ want to increase safety in the City/for residents and employees.
- ⊗ realize that applications of high-tech are contagious and spillover into other departments.

Line Officers 10

- ⊗ perceive the officer safety benefits that come with some technologies.
- ⊗ want to be more efficient/want to do a better job.
- ⊗ want to belong to a technologically progressive police department.

Business Community 11

- ⊗ want a safer community.
- ⊗ supports the police department.
- ⊗ have vested concern in the perception of safety in the community.

Probation/Parole Agencies 12

- ⊗ need greater assistance from police agencies in monitoring probationers/parolees.

SNAILDARTERS

American Civil Liberties Union

- ⊗ is concerned about the implications of any increases in the ability of police agencies abilities to surveil or access information on private citizens.
- ⊗ is willing to litigate to stop perceived intrusions on citizen privacy. Can delay or impede implementation of high-tech biometric databases.

Media/Press

- ⊗ can shape public opinion regarding use of biometric identification.
- ⊗ are very interested in law enforcement activities and innovations.

Hackers/Terrorists

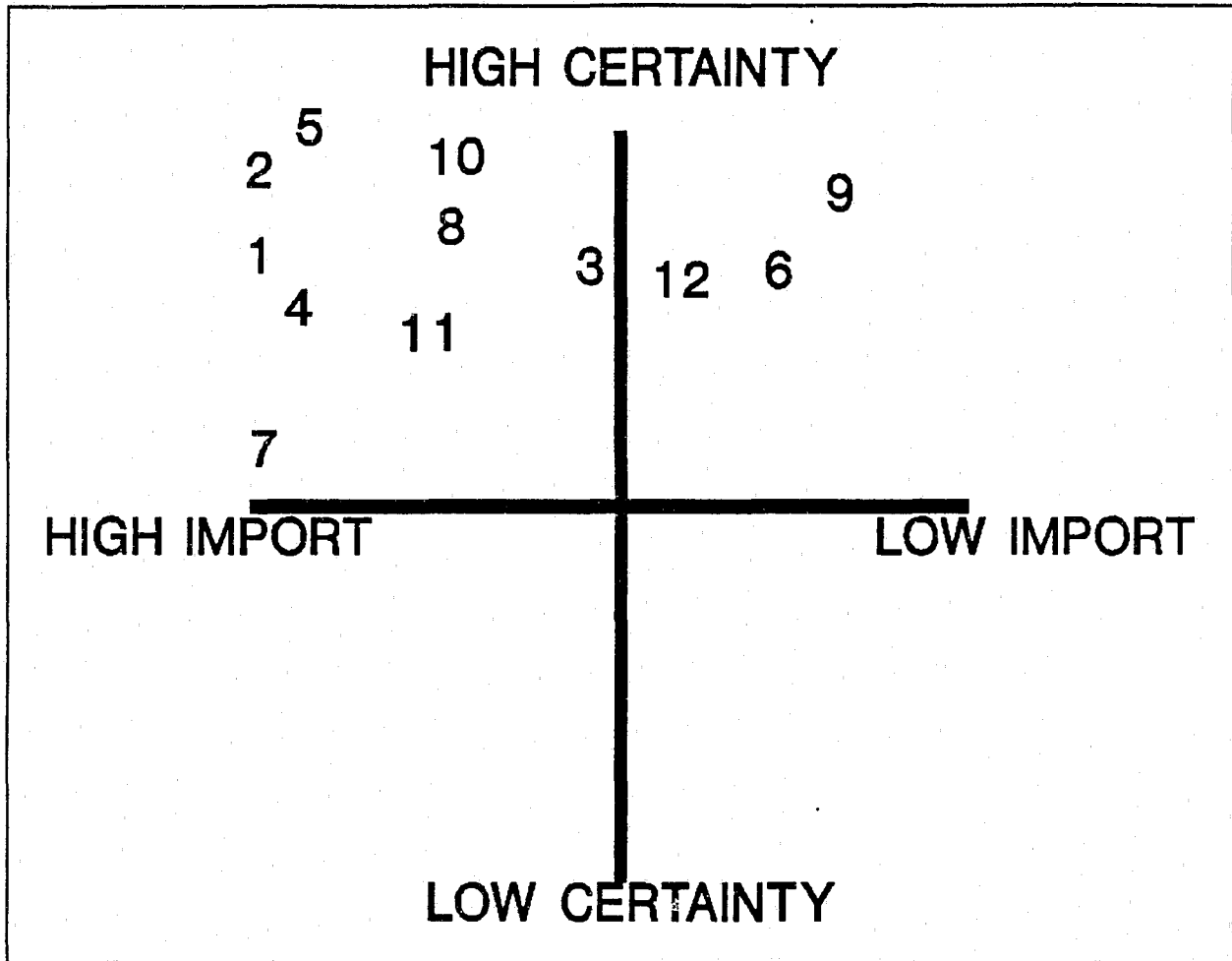
- ⊗ are interested in the information contained in police databases.
- ⊗ can corrupt or destroy data or storage sites.

CAL/OSHA

- ⊗ is interested in the potential health risks posed by computer operation (Video Data Terminal radiation, etc).
- ⊗ has the power to impact/regulate the use of certain technologies.

Graph 1

STAKEHOLDER ASSUMPTION GRAPH



Graph 1

- | | |
|--------------------------|--------------------------------|
| 1. Mayor and Council | 7. Computer Industry |
| 2. City Manager | 8. MIS Director |
| 3. P.O.A. | 9. Other City Department Heads |
| 4. Citizens (Residents) | 10. Line Officers |
| 5. Police Command Staff | 11. Business Community |
| 6. Department of Justice | 12. Probation/Parole |

MISSION STATEMENT

A mission statement codifies the spirit behind all activities of an organization. These statements provide consistency and uniformity in decision-making across the organization. These statements express values, seek commitment to ideals, and serve as a guide for conduct and performance.

MACRO MISSION STATEMENT

PRIMARY MISSION

The primary mission of the Police Department is to proactively reduce the public perception and fear of crime and criminals; identify and eradicate the circumstances that nurture criminal activity, and any other conditions that have detrimental impact upon public safety in our community.

Improving the perception of safety shall take precedence over the generation of impressive but frequently meaningless statistics. All actions will be taken with the intent to improve the quality of life in the City. This mission shall be accomplished through the achievement of the following objectives.

OBJECTIVE I

The Department shall recruit and retain only the most qualified personnel. Personnel of the Department shall be individually and collectively developed to insure that they possess the skills and attitudes necessary to accomplish the Department's mission.

- A. Human resource development processes shall be designed and implemented throughout the Department. These processes will produce personnel trained in the skills and attitudes consistent with the Department's standards and the community's expectations.
- B. Managers and supervisors will be selected and trained to assure that subordinates receive proper guidance and direction in the fulfillment of their duties.
- C. The Department will seek state-of-the-art resources necessary to attract the highest quality personnel, and to support them in the accomplishment of their assigned tasks. The Department will provide high quality, high tech equipment when fiscally responsible to improve the efficiency and effectiveness of its employees.
- D. Department management will create a climate supporting career development and positive recognition for all Departmental personnel, both sworn and civilian.

OBJECTIVE II

The Police Department will provide high quality service and high levels of positive interaction with the community and guests of the community.

- A. All officers, in all interactions with the public, shall treat others with respect and understanding, and will enforce the law in a fair but firm manner. Officers, by their bearing and attitude will send the message to the citizen that the Inglewood Police Department cares about his/her problem and is here to help. Problem resolution, as opposed to mere problem handling, will be the focus of our efforts.
- B. All members of this Department recognize that as peace officers, we represent the sovereign state of California as well as the City. Accordingly, all officers shall maintain a good physical appearance that will inspire the confidence of those we serve. The Department shall maintain an in-house exercise facility to assist personnel in this endeavor.
- C. Officers shall use enforcement tactics, methods, techniques and equipment with the specific intent to minimize danger, harm, and injury to the community, themselves, and suspects of crime. When the use of force is called for, officers shall be circumspect, decisive and resolute in its application.
- D. The Department will stay abreast of our community's demographic profile, and ensure that our recruitment efforts strive for balanced ethnic and gender representation. Adequate levels of personnel with Spanish and other needed language skills shall be maintained.

OBJECTIVE III

The Inglewood Police Department shall constantly pursue and evaluate more effective and cost efficient alternatives to fulfilling its mission of service to the community.

- A. Innovative techniques for fulfilling the Department's responsibilities shall be sought from all levels of the organization. The Department shall anticipate service delivery needs as well as respond to community needs. Properly directed innovation will be recognized and rewarded.
- B. Creativity, imagination and experimentation shall be encouraged. The risk, errors and ambiguity associated with innovation shall be accepted. These negative byproducts of creativity will be minimized by the prompt reporting of bad, as well as good news. The prompt reporting of bad news allows the Department to quickly adjust its course.
- C. Resource use shall be constantly analyzed at all levels of the organization with the objective of providing more efficient and *effective* methods of service delivery to the community.

- D. Efforts of individual units within the Department will be coordinated in pursuit of common objectives, and efforts shall be made to continually reduce unnecessary duplication of effort and resources.
- E. Non-traditional financial resources will be aggressively sought to support Departmental activities and reduce operating costs.

OBJECTIVE IV

Aggressive and on-going efforts will be directed at enhancing professionalism amongst all Departmental personnel. The purpose will be to reflect a positive image, and increase the confidence of the community, as well as other law enforcement and governmental agencies in the ability of the Inglewood Police Department.

- A. All Department personnel shall be treated with respect, and praised, counseled, or disciplined with courtesy and tact. All personnel shall interact with peers, superiors and subordinates in a professional manner. Consideration for the feelings and self-esteem of those that we work with shall be considered in all interactions.
- B. An effective and open relationship with the media shall be pursued (inclusive of print, radio and television). At all times the presentation of a positive Departmental image and the recognition of the special contributions individual officers shall be the focus.
- C. Community relations shall be viewed as a critical function of the Department, and continuing efforts shall be made to involve all Departmental personnel.

MICRO MISSION STATEMENT

Employee Training: The Department will support and encourage employees in their efforts to become familiar with and acclimated to computers and computer technology. The Department recognizes the value of increasing the comfort level of employees in the computer age.

Work Processes: The Department will consistently assess its work processes and procedures with a view towards adapting emerging technology, where such technology will bring a higher level of efficiency and effectiveness.

MODIFIED POLICY DELPHI

Modified Policy Delphi is a procedure used to develop, examine and select policies. The policy delphi group was composed of a diagonal slice (various ranks, assignments) of IPD personnel. This group generated, analyzed and selected policy alternatives that would enable the Department to strategically take advantage of *the impact of emerging computer technologies on field investigations during the next ten years.*

The seven member group was provided information on the general issue, provided with forecasted trends and events and the "desired and attainable" scenario. The policy alternatives were rated for their feasibility and desirability. After further discussion (second round), the group again rated the top scoring policy alternatives on the same criteria and selected the four policies which were rated highest in desirability and feasibility.

1. Develop technology environment scanners within the police department.
2. Establish a law enforcement liaison/commission for emerging technology applications planning.
3. Encourage participation in Law Enforcement associations.
4. Obtain access to all information available in criminal justice system databases for field personnel by 1995.

SELECTED POLICIES ANALYSIS

The four selected policy alternatives received lively discussion during the delphi process. A description of their content, intent and advantages is presented in this section.

1. Develop technology environment scanners:

Designate selected personnel and assign responsibility for long-term research and planning in the area of emerging computer technology with reference to application to police operations. This is a necessary precursor to making the long term goal of bringing the majority of employees into the computer/high-tech era. As children born into the electronic age come of age, these employees will come in the door with a higher level of technological appreciation than exists at present. In the interim, there is a need to encourage high-tech awareness, with an eye toward application.

2) Establish a Law Enforcement commission/liaison for technology application:

The Inglewood Police Department should educate a number of its mid and upper-level managers in the advantages, uses and the future of computer technology. These managers should network with designated personnel from other police agencies in the county in an effort to make our needs known in a consolidated manner to county and city fiscal management, as well as to the computer industry. If this were done on a statewide basis, with a central statewide commission operating under the umbrella of DOJ or P.O.S.T., law enforcement could become more of a driving force in determining the initial application of emerging technologies. The objectives of this group would include the conveying of concepts, development of performance specs, and to articulate the economic opportunities for companies that fashion applications to meet our needs.

3) Encourage Participation in Law Enforcement Associations:

Members of the Department should be encouraged to participate in Law Enforcement associations, (CPOA, Cal Chiefs, IACP, etc.) and push to the forefront of association agendas improvement and streamlining of the Criminal Justice System. Particular emphasis should be placed upon, prison construction, changing rules of evidence, and longer court hours. Such efforts will enhance the effectiveness of the increased arrest activity made possible by the use of advanced technology at the field officer level.

A major problem was anticipated by the group that would likely occur after

biometric identifiers become available in the field. Better supervision of parolees and probationers by law enforcement personnel and more efficient field investigations will be for naught if the other components of the criminal justice system choke on the increase in arrests.

4) Obtain access to Criminal Justice System Databases :

The advantages for field personnel are obvious and have been articulated in depth earlier in this study. A necessary aspect of implementing this policy entails acquiring the technological innovation required to exploit the data available. As an example, retinal eye scan data is useless absent field eye scan devices, access to CAL-ID in the field is useless without fingerprint scan input devices in the field.

ADMINISTRATION/IMPLEMENTATION

(Selected Policies)

1. Develop technology environment scanners:

This process is one of nurturing and encouraging high tech awareness and can be instituted in an expedient fashion, however, significant results may not be obtained for a year or more. The Department should use monies budgeted for periodicals and subscriptions to subscribe to *PC World*, *Computerworld*, *Personal Computing*, *InfoWorld*, *Government Technology* and *PC magazine*. A memo requesting interested personnel to meet with the Planning and Analysis sergeant, the Chief and Captains should be distributed. The importance of understanding and being familiar with emerging technology would be the meeting topic. Interested personnel would be placed on a periodicals distribution list, and would meet quarterly to discuss applications and their potential for use in Department operations. Negotiation strategies required to implement this policy are limited. Either a slight augmentation at budget time would need to be requested or a substitution of computer periodicals for other magazines would be required. The chiefs and captains need

to be convinced of the necessity for high tech enlightenment to tap their subscriptions' budgets.

Timeline: Subscription arrival: 30 days. Meeting Date: 60 days.

2) Establish a Law Enforcement commission/liaison for technology application:

The Chief of Police should forward a communication to his peers in the L.A County Chiefs asking that the concept be placed on the agenda for discussion in the next six months. A presentation to the body should be given, and perhaps a committee would be selected and appointed to make recommendations. This proposal is one that requires cooperation external to the organization. All Los Angeles county collectors of database information are key players, as is DOJ which provides the CLETS interface. Negotiations strategies: Law enforcement - Highlight the benefits for the law enforcement community as a whole. DOJ - Stress the opportunity to take the leadership role in the coordination of in-field biometric identification technologies. Probation/Parole - Stress the benefits of making terms of probation/parole a force to be dealt with. Case workers would receive more prompt notification of violations.

Timeline: Meeting date: Within six months. Committee proposal within 1 year.

3) Encourage Participation in Law Enforcement Associations:

Management meetings are an excellent vehicle to communicate organizational focus and direction. The mentioning of participation in law enforcement organizations and affiliations in annual evaluations as positive reinforcement.

Timeline: Six months to one year.

4) Obtain access to Criminal Justice System Databases :

This policy requires equipment acquisition as well as biometric database proliferation. Database proliferation and access can be facilitated by policies 2 and 3. The

critical mass detailed in Part 3 - The Transition Plan, would have to be persuaded to allow the Department to make the substantial capital outlay to participate. The primary negotiation strategy involves appealing to the common desire to improve public safety in the community and enhancing the City's image as a progressive entity.

Timeline: Approximately 5 years or more.

PART III

TRANSITION PLAN

STATEMENT

The third objective of the study will be to structure a transition management process to facilitate the implementation of the strategic plan to effectively use emerging computer technologies in field investigations. The mechanism is designed to produce a smooth transition from the current state into the future state.

METHODOLOGY: IDENTIFICATION

1. The critical mass was identified by the group referenced on page 46 (*Appendix 3*) of this study to determine those stakeholders crucial to policy implementation.
2. A readiness and capability assessment was conducted to estimate the capacities of the individual key players for participating in the change process.
3. Commitment planning evaluation was used to assess the levels of commitment to the change process required of members of the critical mass.
4. A transition management structure was described whose purpose was to implement the plan.
5. A responsibility chart was completed recommending roles to be assumed by the transition management team.
6. The transition process itself was mapped for the participants.

METHODOLOGY: IMPLEMENTATION

The transition management plan constructed serves a roadmap leading toward the desired and attainable future. The strategic policies outlined in Part II can be applied in organizations of any size, but are more effective as agency size grows. The Inglewood Police Department will be used as the model for transition plan implementation.

CRITICAL MASS

The critical mass was identified by the group referenced on page 46. The following individuals or groups compose the critical mass:

1. Mayor and Council
2. City Manager
3. Police Command Staff
4. Department of Justice
5. Computer Industry

Mayor and Council - The Mayor and Council represent the citizens of the community and implement policy and authorize funding for major undertakings with an eye toward citizen desires and reactions. The council wants increased law enforcement effectiveness and perception by residents of a level of safety in their safety in the community. The council wants a progressive and modern police agency, however, the council needs to be informed and assured that any major capital outlay for technology is well researched and fiscally prudent.

City Manager - The City Manager is the gateway for project approval. In reality, there will be no major capital outlay funding request for the Mayor and Council to approve without his buy-in first. This is his responsibility as the City's CEO, to make operational recommendations to be approved or denied by elected representatives. The City Manager places a high priority on public safety and the perception of safety. The City was named an All-America City for the year 1989, based in part on contributions of the Police

Department. The City Manager has been and continues to be extremely supportive of the Department. He is concerned about the tyranny of technology, wherein one investment mandates a subsequent investment, and leads to technology dictating the mode of service delivery. He wants to be assured that investments in emerging technology will not result in the purchase of equipment that is shortly obsolete.

Police Command Staff - This group recognizes the long-term costs to the City of continually adding more manpower, and seeks productivity and effectiveness increases through technology where possible. The Chief of Police is definitely future oriented and supports the application of emerging technology.

Department of Justice - A key player in this move toward the future. The DOJ operates the CLETS system and is a statewide coordinator and provider of database information. The state already maintains the largest single database of biometric identification - CAL-ID. State coordination and interest in expanding biometric identification devices will signal the economic opportunity for the computer industry and hasten the arrival of the appropriate applications.

Computer Industry - This industry has an economic interest in the development of profitable applications of emerging technologies. The industry looks for clear indicators of profit prior to developing specialized applications for law enforcement.

COMMITMENT PLANNING

Commitment planning is an action plan, composed to assure the support of critical mass members. A correct assessment of the member's position on the strategic plan is crucial to commitment planning. Chart 6 depicts the group's measurement of each member of the critical mass' present and desired level of commitment. The Transition team should pay special attention to the members of the critical mass that must be moved from a lower level of commitment to a higher one. Commitment levels are measured as; block/let happen/help happen/make happen.

Chart VI

COMMITMENT PLANNING				
Stakeholders	Strategic Plan Commitment Level			
	Block	Let Happen	Help Happen	Make Happen
Mayor/Council	X	----->	O	
City Manager	X	----->	O	
Police Command Staff				XO
DOJ			X	-----> O
Computer Industry			X	-----> O

The good news is that only one potential blocker of change resides in the critical mass. The bad news is that all members but one (Police Command Staff) must be moved from their present positions for the desired future state to occur.

READINESS/CAPABILITY CHARTING

Chart VI represents the group's assessment of the Critical Mass' readiness and capability to assist in developing the desired future.

All members of the critical mass were rated in the medium to high range in their readiness and capability. The main question with the Department of Justice is in their capability to network, compile and link the databases necessary to use emerging computer technologies.

Chart VII

CAPABILITY CHART					
CM Member	Readiness			Capability	
	High	Medium	Low	High	Medium Low
Mayor/Council	R			C	
City Manager	R			C	
Police Command	R				C
DOJ	R				C
Computer Ind.	R				C

COMMITMENT STRATEGIES

Commitment strategies are developed based upon the negotiators knowledge of the desires and wants of the other parties involved in the change equation. Only the City Manager is presently presumed to be in the 'Block Change' area. The Mayor and Council need to be persuaded to move from 'Let Happen' to 'Help Happen'. DOJ and the Computer Industry must be persuaded to move from being willing to help into the 'Make Happen' area.

Mayor and Council - The Mayor and Council's primary interest is in providing excellent service and protection to our residents. The most persuasive means to move them is to provide the City Manager with the information that he needs to make a recommendation to the council with confidence. Beyond that, encouraging ride-a-longs by elected officials will provide them with hands on insight into the difficulties encountered by police officers, as well as how the use of technology will improve their effectiveness.

City Manager - There is no substitute for good staff work when dealing with someone that makes a living making financial decisions. Any expenditures on high tech equipment removes monies available for Parks and Recreation augmentations or other

social programs which arguably are very important in this era of declining values. An emphasis on the use of asset forfeiture funds to finance technology improvements is one way to avoid the competition for general fund revenues.

Department of Justice - The Department of Justice controls the California Law Enforcement Teletype System. Funding would be the critical issue in making biometric data available.

Computer Industry - The most persuasive strategy in negotiating with the industry is to show a volume of users ready to purchase products produced to certain specifications. If California were to take a leadership role in this area, manufacturers would realize the benefits of being an early supplier to a statewide system. There would be nationwide opportunities if a biometric based field identification program were successful.

READINESS ASSESSMENT

The readiness assessment in Chart VIII displays an estimate of the Inglewood Police Department's command staff's readiness for change. Their personal motivation, ability to articulate a vision of the desired future, and their sensitivity to reaction of personnel to change are assessed as well. The leaders of the Inglewood PD are the Chief, Deputy Chief and 3 Captains. The command staff of the Department benefits from a blending of talents, skills and abilities. Amongst the members exists a blend of technological awareness, leadership ability, interpersonal sensitivity and willingness to operate under uncertain conditions. The entire staff is motivated and sincere in its desire to place the Department on the leading edge of law enforcement. The diagonal slice group of the Inglewood Police Department referenced on page 46 (Appendix 3) conducted this analysis.

Chart 8

COMMAND STAFF ASSESSMENT	
Awareness	
1. Awareness of the nature of the organization's environment	5
2. Understanding inter-personal structures and relationships	4
3. Technology awareness	4
4. Ability to grasp the impact of change upon subordinates and their behavior	4
Motivation	
6. Ability to present a believable vision of the future of the organization	4
7. Willingness to proceed despite uncertainty	4
8. Willingness to develop contingency plans	3
9. Willingness to activate contingency plans	3
10. Willingness to follow-through on the vision despite setbacks	5
11. Willingness to tap the 'informal' leadership of the organization for goal accomplishment	3
12. Willingness to use non-authority based influence	4
13. Willingness to empower others to facilitate the change process	4
Skills and Resources	
14. Possesses the conceptual skills to compose and articulate a vision of a desired future	4
15. Possesses effective inter-personal skills to coach and cheer on change	3
16. Possesses effective working relationships with other organizational key leaders	4
17. Possesses effective relationships with representatives of critical mass actors	4
<i>1 - very little 2 - little 3 - somewhat 4 - great degree 5 - very great degree</i>	

TRANSITION MANAGEMENT STRUCTURE/IMPLEMENTATION

The transition management team must contain individuals that collectively possess the skills and abilities necessary to identify the desired future state, assess the present state, and map out and take the steps necessary to move between the two.

It is jokingly said that the six phases of a project are: (1) Enthusiasm, (2)

Disillusionment, (3) Panic, (4) Search for the Guilty, (5) Punishment of the Innocent, (6) Praise and Honors for the Non-Participants. While this may be said in jest, in far too many cases, this is the scenario when ambitious change is attempted.

The transition management team need not personally take all the steps necessary to move the organization through the transition state, however, the team must mobilize both the resources and other personnel to ensure that the change is accomplished.

Strong interpersonal skills are required as well as individuals that are not prone to 'abandon ship' when the waters look rocky. The initial enthusiasm for the project inevitably wanes, and the organization wades through a valley of despair that requires enthusiastic and energetic leadership to bring the organization back on track.

Extreme credibility and competence of transition team members is mandatory, and the Department's leadership, by its past track record must command the respect and confidence of the organization, or a change of any significance is doomed before it starts.

The Inglewood Police Department already has several transition management teams in place working through the transition process in the areas of *uniform presence augmentation, automation planning, employee rewards and recognition*, and other areas. The transition teams are labeled *Strategic Planning Committees*, and employ the structure of *Diagonal Slice and Relevant Subsystems* to determine committee composition. A central committee, composed of a command officer, lieutenants, sergeants, and civilian management have received special training to serve as facilitators to the individual committees. The Deputy Chief of the Department serves as facilitator for the various committees as well and serves as the Department's overall automation coordinator. In addition to the SPC on automation, a *Police Automation User's (PAUG)* Group composed of users from various units of the Department meet to provide the *SPC* on automation input on what they want from their computer systems and how they want to interact with them.

The current project would proceed using the present transition structures, with the Deputy Chief of Police serving as the Project Manager. Within 5 years, significant transition to emerging applications could occur.

The strategic planning model used in the Department has application to any type of change management process, and is applicable to police agencies of any size.

SUMMARY

Part I - Defining the Future

Part I analyzed the general issue using research futures forecasting methodologies. In reference to the use of emerging computer applications by operations units for field investigations, a desired and attainable future was proffered. A normative scenario was offered that articulated a future in which habitual criminals were easily identified and monitored, and where all suspicious subjects encountered by law enforcement personnel were positively identified for future reference.

A myriad of emerging applications were cataloged and explained in relation to the general issue.

Part II - Strategic Plan

A strategic plan was constructed that will enable a desired and attainable future. Policy considerations, decision-making methods and the planning process were analyzed. The City of Inglewood Police Department was used as the model for this plan. Four policies were developed and recommended for implementation:

1. Develop technology environment scanners within the police department.
2. Establish a law enforcement liaison/commission for emerging technology applications planning.
3. Encourage participation in Law Enforcement associations.
4. Obtain access to all information available in criminal justice system databases for field personnel by 1995.

Part III - Transition Management

The transition plan was developed to assist the organization in moving through the change process. The steps, potential pitfalls, and change strategies were discussed. The transition planning considered the anticipated positions of the critical mass, and offered negotiations strategies to shift their level of readiness and commitment to change process and project implementation.

CONCLUSIONS

This study has provided insight into the general issue: *The Impact of Emerging Computer Technology on Field Investigations by Operations Units of Urban Law Enforcement Officers by the Year 2000*. The central theme of the study was the in-field provision of biometric identification technologies by means of computer. The trend toward more powerful, more compact computers was explored. Alternative input technologies, combined with artificial intelligence developments, promise to make computers more intuitive, less imposing, and easier to use. Voice recognition and computer voice simulation will allow the officer to do away with the pesky and non-field operations compatible computer keyboard. Interactive voice and artificial intelligence applications will allow the officer to interrogate non-english speaking witnesses and suspects.

The primary impact upon field investigations will most likely be shown in the ability to monitor and identify career criminals. A study by the *RAND CORPORATION* revealed the 60% of violent crime is committed by 10% of California's criminal population. Los Angeles County now has more than 90,000 adults on formal probation of which 27,000 are classified as high risk.

Oftentimes, peace officers conduct investigative stops of individuals that are on probation or parole, in situations where the subject is in violation of the terms and conditions of the supervised release. By not carrying ID, the subject can prevent his supervised status from being discovered. Even in those cases where the subject gives his

true identity and volunteers his probation or parole status, the officer cannot receive an on-line listing of his terms and conditions of probation. Biometric identification at the field level will no longer require the officer to depend upon the generosity of the suspect.

Processes can be conducted at the preliminary investigation level that today are conducted after a lengthy delay by detectives and scientific services personnel. Safety will be enhanced because officers will receive instantly, information that now can take minutes, hours and days to receive.

Employing emerging computer technologies shortly after introduction is almost always an expensive proposition. The fact that neither police administrators or city managers are willing to amortize technology purchases as they would an automobile purchase compounds the problem. Most computer technologies are obsolete in five years time. Asset forfeiture monies are law enforcement's best hope to participate.

As law enforcement assimilates the 'Nintendo' generation into its ranks, the need for specialized training to handle computer equipment should diminish. The introduction of interactive voice technology will eliminate the need for keyboard skills to tap the power of the computer.

The perception by groups that consider themselves police watchdogs have already evidenced a keen interest in the use of sophisticated computer systems by law enforcement in relation to privacy issues. The concerns stem not from the fear of effective law enforcement, but from the capability to monitor persons or groups not directly connected to criminal activity. Increased computer systems interconnectivity and immediate access will give the field officer such capability. Careful rules and policies must continually be developed and analyzed to prevent privacy breaches.

The number of databases available and under development will make an investment in computer high technology by police agencies worthwhile. The emergence of expanded biometric identification databases shows great promise over the next three to five years.

The continually shrinking computer and computer interface equipment will ensure

that downsizing of automobiles will not impact ability of field officers to carry extremely powerful computer equipment in the field with them.

File formats and file compatibility issues will most likely be coordinated by the largest holders of biometric identification databases. In the case of California law enforcement, those holders are the State of California and the Federal Bureau of Investigation.

IMPLICATIONS FOR FUTURE STUDY

Other topics for necessary study became apparent in the course of this futures study.

The Future of Incarceration: Data presented in the introduction section and writer's 17 years of personal experience in law enforcement suggest that it will be necessary (absent other measures) to incarcerate a segment of our population to prevent them from preying upon and abusing law abiding citizens. It also plain that prison construction is a slow process, with site location decisions alone sometimes taking 5 to 8 years. Alternative methods of behavior modification will have to be developed.

Enforcement Prioritization: Using the technologies outlined in this study, officers will know immediately with whom they are dealing, and more easily develop probable cause for arrest. Police command officers may have to set minimum enforcement limits to prevent officers from constantly being tied up on minor bookings.

Computerized Report Writing: The technologies highlighted in the study, particularly Artificial Intelligence and Interactive Voice, show promise for enabling law enforcement to recapture large blocks of time spent completing reports. The procedure will allow direct computer entry into the agency mainframe from the field, thereby eliminating the need for the handling, and filing of reports by records personnel. Expert Systems programs can automatically provide updated crime analysis data based on rules generated by the inference engine. Many jobs might be eliminated or redirected by this technology.

Language Translation: Interactive voice combined with computer voice and AI might foretell the end of Spanish translator bonuses, and other foreign language premium pay. Officers of the future may not necessarily be required to speak multiple languages.

Automatic Vehicle Location (AVL): Automatic vehicle location when linked with the capabilities of the powerful computers of the future, has very interesting possibilities in the areas of precise control of deployments, efficiency tracking and modeling for police operations. Combined with the computing technologies outlined in the normative scenario, the officer's computer becomes the ground equivalent of the flight recorder in an aircraft.

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APPENDIX 1

TRENDS

1. Level of Community Support in California for Police.
2. Unemployment Rate in California.
3. Level of Competition for Police Recruits.
4. Ease of use of Computer Software and Hardware.
5. Development of Expert Systems for Law Enforcement Personnel.
6. Compacting of Intergrated Circuits.
7. Levels of Asset Forfeiture Funds Returned to Police Agencies. *
8. Public Tolerance of the Personal Threat of Criminal Activity.
9. Concern of Public and Elected Officials over Privacy Issues.
10. Level of Enforcement of Immigration Laws.
11. Variety and Amounts of Database Information to Available to Field Officers. *
12. State and Local Government Expenditures on Police in California.
13. Rate of Incarceration in California Prisons.
14. Rate of Prison Construction.
15. Use of Incarceration Alternatives.
16. Public/Political Preference for Implementation of Community Oriented Policing Styles.
17. Use of the Initiative Process in Restricting Local Muncipalities' Ability to Raise Revenues to Maintain or Increase Service Levels.
18. Levels of Inter-Agency Cooperation.
19. Education and Maturity Levels of Police Recruits.
20. Level of Transient Population in California.
21. Level of State Coordination of Database Standards. *
22. Computer Hardware Physiology (Power/Storage Costs per Megabyte/Size). *
23. Level of Computer Aided Dispatch Sophistication.
24. Civilianization of Police Agencies.
25. Adaptability of S-O-T-A Technologies to Public Sector Needs.
26. Level of Task Specialization in PD's.
27. Availability of Advanced Input/Output Dev/Computer Assisted Identification. *
28. Police Liability/Litigation Levels.
29. Public Impatience with Slow Results in War on Crime.

30. Display Resolutions and Monitor Size.
31. Employee Computer Literacy.
32. Levels of Governmental Involvement in Strategic Planning.
33. Municipality/County Consolidation of Services.
34. Computer Industry profitability.
35. Emphasis on Enforcement (Property Crime v. Person Crime v. Social Order)
36. Citizen Involvement in Police Decisions.
37. Service and Support of S-O-T-A Technologies.
38. Quantity and Quality of Stored Information.
39. Computer Crime.
40. Level of Citizen Satisfaction with Police Services.
41. Education/Diversity of Community.
42. Employee Level of Commitment to Service.
43. Equipment Acquisition/Training Costs.
44. Privatization of Police Services.
45. Data Transfer Rates.
46. Level of Domestic Terrorism.
47. Criminal Justice System Costs.
48. Infrastructure Vs. High-Tech Expenditure Ratio
49. Public Awareness of Crime.
50. Police Corruption.
51. Printer Speed.
52. Information Exchange Technology.
53. S-O-T-A Equipment Size.
54. Database/Systems Linkage.
55. High-Tech Overload/Computerphobia.
56. High-Tech Dependence.

APPENDIX 2

EVENTS

1. Economic Recession/Depression with Mass Unemployment.
2. Fingerprint Classification Mag-Stripe Encoded on Driver's License. *
3. Major Earthquake or Disaster Disrupts Power & Communication.
4. Citizen Dissatisfaction Results in Citizen Review Boards/Commissions.
5. Police Channels Incorporated on Satellites.
6. War In Middle East.
7. ACLU Sues to Restrict On-Line Access to Various Databases. *
8. Special Fund Established for Augmenting Police Operations.
9. Right to Anonymity Established/Broadened by Supreme Court.
10. Local Hotel Used as Contract Jail.
11. Low Cost Property-Tracking Devices Incorporated into all Electronic Goods.
12. State/Nat'l Gun Control Laws Drastically Increase Data Storage Requirements.
13. Automatic Vehicle Location Technology Implemented Statewide.
14. Paper and Coin Currency Abolished.
15. Hand-Held MDT's Provided for Field Officers.
16. ANI & ALI (Phone number caller display) Available for All Calls.
17. Optical Disk Storage Technology Becomes Easily Affordable.
18. Voice Recognition Perfected for Field Use. *
19. Optical Character Recognition Perfected.
20. Asset Forfeiture Sharing Laws Modified to Reduce Police Shares. *
21. On-line Access to Parole/Probation Information Established. *
22. National/State Identification Cards Required of All Citizens.
23. Cocaine/Marijuana Legalized.
24. Due to Budgetary Problems, Regional Policing Enacted.
25. An Initiative Passes, Cutting Property Taxes By 50%.
26. Jail-Overcrowding Results in Suspension of Arrests for Traffic Warrants and Non-Violent Misdemeanor Crimes.

APPENDIX 3

NGT PANEL (PG. 9)

1. Chief of Police - Hawthorne PD
2. Mangement Information Services Director - City of Inglewood
3. Bunco Fraud Investigator
4. Planning/Analysis Sergeant
5. Crime Task Force Officer - (13 time CHP auto theft award winner/MDT user)
6. Communications Sergeant
7. Patrol Lieutenant
8. Resource Development Division (Personnel) Lieutenant
9. Crime Prevention Officer
10. Deputy Chief of Police
11. Director - Planning and Analysis (Civilian middle manager)

SUBJECT MATTER EXPERTS (PG. 46)

1. Bunco Fraud Investigator
2. Planning/Analysis Sergeant
3. Crime Task Force Officer - (13 time CHP auto theft award winner/MDT user)
4. Communications Sergeant
5. Resource Development Division (Personnel) Lieutenant
6. Crime Prevention Officer
7. Director - Planning and Analysis (Civilian middle manager)