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PERSONAL COMMUNICATIONS SYSTEMS: TELEPHONES OF THE YEAR 2000 AND THEIR IMPACT ON A MEDIUM-SIZE POLICE DEPARTMENT

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by

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COMMAND COLLEGE - CLASS 11

JANUARY 1991

11-0201

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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PROJECT BACKGROUND

A brief history of wireless portable communications. Cellular radio technology and its current impact on law enforcement is explored. The communications revolution of the future.

PART ONE - FORECASTING THE FUTURE

What will be the impact of personal communications systems (PCS) on a medium-size police department by the year 2000? What problems will PCS create for law enforcement? What opportunities will PCS offer for law enforcement?

PART TWO - STRATEGIC MANAGEMENT PLAN

A model plan to assist a medium-size police department develop support and marshal the resources necessary to effectively impact the emerging PCS trend. A positive approach designed to mitigate problems and emphasize opportunities.

PART THREE - TRANSITION MANAGEMENT PLAN

An implementation process and timetable to assist in building commitment, identifying tasks, fixing responsibility and accountability, and providing feedback.

CONCLUSIONS AND FUTURE IMPLICATIONS

The significant change from calling a location to a future of direct individual-to-individual communications has subtle yet powerful implications on law enforcement. Problems and opportunities are explored. Suggestions for future studies.

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Abstract

PERSONAL COMMUNICATIONS SYSTEMS:
Telephones of the Year 2000
and
Their Impact on a Medium-Size
Police Department

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Abstract

This study examines the emerging trend of portable personal communications (PCS) and the potential impact on law enforcement; specifically on a medium-size police department during the next ten years. It looks beyond the current cellular technology and into the next several generations of wireless portable PCS that promise to significantly change the way society communicates. The significant change from calling a location to a future of direct individual-to-individual communications has subtle yet powerful implications on law enforcement. Through scenarios, the study explores the problems and opportunities a medium-size law enforcement agency can expect to encounter. The outcome is a positive approach strategic management plan that could empower a medium-size police agency to "push", rather than be "pulled" by, the emerging communications. By "pushing" the technology law enforcement might mitigate the problems and enhance opportunities to provide a safer environment for the community it serves. Futures forecast results; graphics; references; planning and management instruments in appendixes.

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EXECUTIVE SUMMARY

Order # 11-0201

This study examines the emerging trend of portable personal communications and the potential impact on law enforcement; specifically on a medium-size police department during the next ten years. It looks beyond the current cellular technology and into the migration paths of the next several generations of wireless portable personal communications systems that promise to significantly change the way society communicates over distance. The significant change from calling a location to a future of direct individual to individual communications has subtle yet powerful implications on law enforcement.

The study takes an optimistic view of a future in which the ever present, on the body personal telephone is commonplace. Through scenarios, the study explores the problems and opportunities a medium-size law enforcement agency can expect to encounter during the next ten years. The outcome is a positive approach strategic management plan that could empower a medium-size police agency to "push", rather than be "pulled" by, the emerging communications of the near future. By "pushing" the technology law enforcement can mitigate the problems and enhance it's opportunities to provide a safe future environment for the community it serves.

Part 1: Forecasting the Future

The use of personal communications systems (PCS) will increase dramatically. PCS devices will shrink in size and have more features. In ten years the cost will be less than half of what it is today. Multiple wireless private systems will interconnect with existing wired networks. Evolution versus a revolution. Exotic singular systems, like satellites, will probably not be commercially feasible within the study time. Radio frequency spectrum availability is impacting development. Potential legislation and technology breakthroughs will positively impact PCS. A

significant natural event, like a major earthquake, will increase demand for PCS. Opportunities for law enforcement overshadow problems.

Part 2: Strategic Management Plan

A medium-size police agency cannot, on it's own, "push" PCS technology. A systematic approach to garner internal, local and the law enforcement community support will be necessary to successfully impact the issue.

Part 3: Transition Management Plan

An implementation process and timetable designed to build commitment, identify tasks, place responsibility and accountability, and provide feedback. Suggested implementation techniques.

Conclusions and Future Implications

An overview of a PCS future. Current PCS problems that emphasize the necessity to act. A need for further study.

TABLE OF CONTENTS

PROJECT BACKGROUND

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The telephone has come a long way since the day Alexander Graham Bell told his laboratory assistant over a primitive liquid transmitter, "Mr. Watson, come here; I want you." Today, that liquid transmitter has evolved into cordless phones, tapeless digital answerphones, speakerphones, integrated telephone answering machines, cellular phones, phones with auto-dialer memory, on-hook dialing, voice dialing and other applications.

While telephones have been around since the last century, it is only in the last twenty years that they have become an absolute necessity. The information age relies on the rapid delivery of voice and data accomplished through a telephone-like device and transmitted by a variety of methods from wire to satellite radio telemetry. Until very recently the average public user was restricted to originating and receiving a telephone call from a standard business or home telephone wired to and routed by a huge corporation.

First came deregulation and the break-up of AT&T. New players in the field fostered new services, new phones and new ways to transmit voice and data. Portable phones allowed customers to stray up to 500 feet from their hard-wired base station. This move toward wireless phones provided a new degree of freedom for the businessman and homeowner alike. People could move around their home or business and still be teleconnected. Was this a trend, the beginning of a communications revolution, or just another new electronic gadget?

The next step became commercially available in 1983. On October 13, 1983, in Chicago, an executive with Ameritech Mobile Communications placed the first commercial cellular phone call in the United States.[1] The cellular revolution had begun. The cellular telephone wasn't just another "cordless" telephone gadget; those are simply extension phones without wires. By contrast, the cellular phone can operate without wires throughout an entire cellular area, and it can make long distance and international calls through the existing hard-wired telephone network.

Washington, D.C. and Baltimore became the second and third cities to go on the air with cellular service when the Cellular One non-wireline system began operation in December 1983. Washington also became the first city in the world to

have competing cellular systems on April 2, 1984. By mid-July 1984, 13 U.S. cities had a least one cellular system operating.

Before cellular radio came along, mobile telephones were primarily an overpriced luxury service. Because of a limited radio channel availability, only a few hundred people could in a given city own car phones using the equipment that existed before cellular - and only a dozen or so of them could place a phone call at the same time. In major cities the waiting list for a mobile telephone was 5- to 10-years. A good indication of the market for more mobile telecommunications.

To understand how cellular telephones work, it is helpful to recall that mobile pre-cellular telephones required a powerful two-way transmitting system that fed directly into a large antenna located somewhere near the center of an urban area. The range was 25 to 35 miles. Because the signal from the antenna blanketed an entire area, only one car telephone could use a single frequency in that area at any one time. And because only about 12 to 24 channels were allocated to each urban area by the Federal Communications Commission, only one or two dozen calls could be placed at one time.

By contrast, instead of one large antenna in the center of a city, a cellular system divides the city into a number of smaller segments or "cells" (hence the name "cellular"). Each cell has its own antenna, with the cells spaced throughout the area so that their signals overlap slightly. When a call is made using the cellular system, the signal is fed into the cell that is nearest the phone. If the phone is in a car or moving, the signal will eventually begin to fade at that cell site. A central computer constantly monitors the strength of the signal not only in that cell but also in adjacent cell sites. As the phone moves from one cell to another the computer sends out a data signal to both cells, instructing them to "hand off" the signal from one cell to the other. This "hand off" takes place in a fraction of a second. The central computer also routes cellular calls into the conventional landline telephone networks, allowing cellular phones to place calls anywhere in the world.

Because the cell sites have low-powered transmitters, the same frequencies can be reused at other, non-adjacent cell sites elsewhere in the city allowing an almost unlimited number of phone calls to be placed from cellular phones at the same time. As the number of users increases the cells can be "subdivided" into a series of smaller cells, thus increasing the number of available channels.

The cellular telephone revolution was generally overlooked by law enforcement during its infancy. Law enforcement journals didn't begin to report on

cellular telephones until late 1986. However, in an article in The Futurist,[2] Stuart Crump talks of the importance of cellular radio as the first step in the personal communications revolution. Crump writes that Megatrends author John Naisbitt pointed out that the development of an international personal communications network will lead to communications directly between individuals, bypassing the national communications networks completely. "In effect," Naisbitt said, "this new multi-national satellite-based individual-to-individual communications system will break down the last of the national barriers. That is extraordinarily important. People will be connected as individuals regardless of where they happen to be physically located at any one time." The coupling of modern communications satellites with personal communications systems as in cellular radio "might help fashion us into some sort of global family," Naisbitt explained. "It will have social and political implications that are as profound as those which came with the introduction of the telephone itself to our society."

Early cellular was expensive and considered a luxury. But, as with every new electronic technology, the price of cellular service has dropped dramatically, but, as yet is far from cheap. However, car phones are being installed at the rate of 100,000 per month according to the Cellular Telecommunications Industry Association. More than 70 percent of Americans now live in localities with cellular service.[3] Remarkable, when one remembers cellular phones have only been commercially available since 1983.

Law enforcement, with a few exceptions in major metropolitan areas, was slow to embrace cellular telephones. An article in the Police Chief, June 1989, by Maurice Q. McGough of the St. Petersburg Police Department, Florida concluded that cellular phones in police vehicles facilitated communications, allowed better decision making and were highly cost effective.[4]

For medium-size and smaller law enforcement agencies cellular phone acquisition has been slow in coming. Generally, these agencies have acquired cellular service as a result of a significant event. In fifteen seconds, Northern California's Loma Prieta Earthquake on October 17, 1989 probably sold more cellular service than all the advertising campaigns since cellulars inception. The majority of cellular sites in the hilly terrain of the affected area had auxiliary power generators that allowed uninterrupted phone service for the scores of emergency workers so equipped.[5] Other recent events such as the Avianca Flight 52 jet crash in Cove Neck, New York[6], the fiery emergency landing of the passenger jet in Iowa

and several hurricanes have had government purchasing agents flocking to the nearest cellular phone provider.

The proliferation of "pigtail" antennae on automobiles have had another significant impact on law enforcement. The estimated 5.4 million cellular phone subscribers in the U.S. by the end of 1990 means that many people have instant access to a telephone any time they are in a cellular service area. The obvious increase in calls for service from persons witnessing accidents, drunk drivers and various other crimes in progress has severely taxed law enforcement resources. Not only are more incidents being reported, they are being reported as they occur. More often than not the reporting parties are observing the suspects as they make their calls. Law enforcement is having to re-think its priorities as more crimes in progress are being reported via cellular telephones.

The information above serves only as background for the thrust of this study. This study is a futures research project that will attempt to gauge the impact on law enforcement of the emerging technology in portable personal communication systems. As people begin to acquire the personal communication systems of the future, they may do so with an expectation of greater personal safety. Ensuring its citizens are safe from criminal attack has always been a goal of law enforcement; but, will law enforcement be able to respond to increased calls for service from a highly mobile expectant public? The study attempts to gain an insight into the potential technology paths and then determine if law enforcement should be "pushing" or allow itself to be "pulled" by the personal communications technology of the future. Based on input from experts in the industry, opinions of law enforcement managers and an analysis of selected trends and potential events, several future scenarios have been constructed. The end result is a strategic management plan designed to assist a medium-sized police agency cope with, or in the best case, use the emerging telephone technology to help keep its citizens safe.

It is also about the impact on law enforcement of a communications revolution in which cellular was the first step and the coming generation of PCS, the next step. Naisbitt's theory that in the future, the coming of an inexpensive, practical, and totally portable wireless telephone will at last bring us to the era of personal communications is the heart and soul of this paper. The shift from calling a location to calling an individual has subtle yet powerful implications on how law enforcement will do business in the future. The Dick Tracy wristwatch telephone is not quite here, but a completely self-contained portable cellular telephone that

weighs scant ounces and fits in a shirt pocket has been on the market for over a year. Even smaller, lighter, and more powerful models are coming.

The importance of most revolutionary new inventions is generally underestimated during their infancy. When Alexander Graham Bell first demonstrated his early model telephones, few people appreciated just how radically different his device was. Many viewed it as a "toy." A member of the British Parliament, upon seeing it for the first time, is reputed to have commented, "This may be well and good for our American cousins, but we shall have no need of it because we have an adequate supply of messenger boys."

Indeed, ninety per cent of the households in this country now have telephones, and like the member of Parliment so long ago, one may decry the current rush toward portable phones as unnessary and frivilous. But like the early telephone, portable personal communication systems are here to stay. The growth of cellular in the last several years is indicative of the public demand to be able to communicate while on the go. Industry will deliver and law enforcement must be able to stay up with coming communications revolution.

PART ONE

FORECASTING THE FUTURE

PART 1: FORECASTING THE FUTURE

Historically law enforcement has reacted to trends and social change. In fact, reacting to changing situations is the very basis for police officer training and orientation. New officers are taught to react to a threat, always waiting for an attacker to make the first move. That thinking is inbred and codified in law. While planning does exist in law enforcement, until very recently, it was mostly limited to personnel or budget issues and in countering abnormal increases in criminal behavior such as drug abuse or gang violence. Reactionary planning.

Following the lead of business and industry, whose very existence is dependent on knowing what the future holds, law enforcement has begun to employ futures forecasting as part of the strategic planning process. By distilling an issue, viewing it in terms of current trends and analyzing the impact of probable events, law enforcement can truly become pro-active in its planning.

The issue this futures research project addresses is how law enforcement should prepare for a fundamental change in one significant method it uses to transmit and receive information over distance.

Certain concepts are important to understand the issue question. Two key concepts are defined below:

Personal Communication System (PCS) - A small, completely portable personal telephone-like communication system that allows two-way voice and data transmission at a cost equal to or less than today's mobile cellular telephones. The study is concerned with the potential use or problems created by PCS, not the specific technology or how it will work.

Medium-Size Police Department - A full service municipal police agency employing between 50 and 100 police officers. This model was selected due to the sheer number of law enforcement agencies in this category.

Specifically the issue question is:

What will be the impact of personal communications systems (PCS) on a medium-size police department by the year 2000?

In order to focus the study, a futures wheel (Appendix A) was employed to identify relevant law enforcement related sub-issues. They are:

1. What problems will PCS create for law enforcement?

Problems PCS will create may include such things as a steady increase in calls for service. Instant access to the future ever-present, on-the-body, personal phone will enable citizens to report more crimes in progress. Law enforcement must be able to respond immediately or it will be subjected to a great deal of criticism.

Currently, many cellular phones are being purchased for safety reasons. The assumption is that help can be instantly summoned in case of an emergency or a breakdown on the road. Due to its reduced size and portability, PCS will provide an even greater expectation of instant help as people begin to carry these devices everywhere. Again, law enforcement will be faced with the problem of response as well as some additional issues, caused by increased mobility, of locating the caller and determining the jurisdiction.

Privacy issues, criminal use and portable phone use restrictions are examples of other problems law enforcement is already facing. While "more of the same" is an appropriate response, law enforcement has yet to appreciate the potential impact of the "more".

2. What opportunities will PCS offer for law enforcement?

In many regards the opportunities and the problems are the same. By staying current with the technology and learning from private and business applications, law enforcement may find PCS to be a valuable asset in achieving its mission goals. Federal Communication Commission and Public Utility Commission regulations of the telecommunications industry are avenues law enforcement may be able to use to make PCS an opportunity rather than a problem.

The advanced communication capabilities PCS can offer may drastically alter the methods law enforcement uses to receive calls and dispatch police officers. Disaster management and secure private communication networks are examples of opportunities for law enforcement.

At this early stage in PCS development, law enforcement has an opportunity to understand the technology and then begin planning for the communications of the future. A simple awareness of the issue may go a long way in mitigating the potential problems.

Trends and Events: Identification and Forecasting

Trends are defined as patterns of happenings over time, while events are discrete occurrences which either happen or do not happen. Trends and events are identified, screened, and forecast in order to examine their future interrelationships and resulting impact upon the issue question and sub-issues being studied.

Several methods were used to identify trends and events that may impact the issue question. Since the issue concerns future technology, literature scanning was mostly limited to newspapers, trade journals, periodicals, Federal Communication Commission Notices of Inquiry, and communication industry "white" papers. Face-to-face and telephonic interviews with subject matter experts were used extensively to create lists of trends and events. Finally a list of thirteen non-directional trends and fourteen events were identified for further analysis.
(See Appendix B)

The Modified Conventional Delphi process was chosen as the vehicle to further screen and rate the forecast value of the trends and events. The Delphi technique is a method for structuring a group communication process to allow it to effectively deal with complex issues. The basic assumption of Delphi is that knowledgeable individuals can make useful estimates based on incomplete information. That expert judgement is used as a surrogate for direct knowledge in situations of uncertainty, as in this futures forecast. The panel members are anonymous to avoid affecting certain forecasts that may be sensitive in regards to research and development. The nature of this study and the need to query experts located in various cities around the country made Delphi the obvious choice.

The Modified Conventional Delphi technique employed consisted of two rounds. In the first round, panel members received information on the issue and sub-issues, the parameters of the study and the key concepts as noted above. An instruction sheet was provided to ensure each panel member shared a common understanding of the task. The first task for the panel was to select the trends and events they believed to be the most valuable to forecast with regards to the issue question. By this method the trends and events were reduced to those most likely

to affect the issue and sub-issues and then forecast.. In the second round, each Delphi member was provided with the median and range of the forecasts as feedback for final evaluation. They were asked to reforecast the trends and events in the final set. The author then conducted a cross-impact analysis on the final set of five trends and five events. That analysis was employed to construct three scenarios for the future. (See Appendix B for numeric values)

The trends which were identified as being the most desirable to forecast for the purpose of strategic planning were:

T-4 The Size of Portable Phones - Defined as the weight and size of portable two-way wireless communication devices.

T-6 Availability of Wireless Frequencies - The amount of space and competition for the radio frequency spectrum used for portable, cellular and other forms of wireless communication.

T-7 Safety Assumptions - The number of private citizens that assume their personal safety is enhanced if they have a portable telephone to summon help.

T-8 PCS Use - The number of citizens using portable wireless two-way communications.

T-9 Cost of Personal Portable Communication - The affordability of portable wireless two-way communications.

The direction and level of each trend in terms of where it was five years ago, where it will be five years from now, and its level ten years from now were forecast by the Delphi panel. Also, at five and ten years from now, the panel was asked what their "desired " level of the trends would be. (Refer Appendix B)

The possible future events selected as having a potential impact upon the issue being studied were:

E-2 RF Availability - Technology to compress or enhance the radio spectrum to allow virtually unlimited radio communications is developed.

E-4 Super Battery - A reasonably priced battery with 10+ times the energy / density ratio of present batteries.

E-7 Personal Communication Networks (PCN)[7] - The nation would be blanketed by low-power transmitters. A call sent from one phone to another would either travel from one transmitter to the next, or to a central switching

system which would send it to another city. The system uses "smart card" encoding to locate the phone being called regardless of its location.

E-13 Major Earthquake in California - A major earthquake devastates land-based communication facilities in California.

E-14 Dingell Bill - The Emerging Telecommunications Technology Act (Rep. John Dingell, D-Michigan), reallocating 200 MHz of military spectrum for civilian use (or similar legislation), is passed.

The percent probability of occurrence, the number of years down line before the probability first exceeds zero, and the positive and negative impact each selected event would have upon the issue and sub-issues was forecast by the panel for the purpose of analysis and use in the future scenarios.
(Refer Appendix B)

Cross-Impact Analysis

The cross-impact analysis gauges the impact of each selected event upon the other events and the trends. The events which will cause the greatest amount of change, called "actor" events, were identified. The "actor" events and their resulting impact were identified in order of importance as:

Event 13 - Major Earthquake in California

The positive impacts of this event are:

1. Increases the likelihood of citizens utilizing some form of wireless communications from a safety standpoint.
2. Increases the likelihood of legislation to force RF spectrum reallocation and development work to enhance or compress the spectrum.
3. Would aid development in private wireless personal communication networks and personal communication systems that operate parallel to wired, more vulnerable land-based networks.
4. Increases the likelihood industry will speed development on a better battery.

The negative impacts are:

1. Demand will probably outstrip supply causing the cost of PCS to increase.

2. The rush to supply will temporally slow development of miniature devices.

Event 4 Super Battery

The positive impacts of this event are:

1. The size of portable phones can be significantly reduced.
2. Increases the likelihood of legislation to force RF spectrum reallocation and development work to enhance or compress the spectrum.
3. Should aid development in private wireless personal communication networks and personal communication systems.
4. Increases the likelihood of greater public acceptance due to smaller size and portability.

The negative impacts are:

1. The cost of personal portable communications will be higher until research and development expenses are recovered and competition stabilizes the market .
2. Will further crowd the already overcrowded airways.

Event 7 - Personal Communication Networks

The positive impacts of this event are:

1. Increases the likelihood industry will speed development on a better battery.
2. Increases the likelihood of legislation to force RF spectrum reallocation and development work to enhance or compress the spectrum.
3. Increases the likelihood of smaller devices due to relatively short range needed.
4. Widespread PCN will increase safety assumptions.
5. Developed PCN will foster other PCS development.

The negative impacts are:

1. More contention for the airways.
2. Will likely be expensive to implement.

Event 2 - RF Availability

The positive impacts of this event are:

1. Will allow widespread implementation of private and public wireless systems (PCN and PCS), and should increase use.
2. Increases space on the overcrowded existing spectrum.
3. More spectrum will increase interest in a super battery.
4. Increase the interest in smaller portable phones and slightly increase safety assumptions.

The negative impacts are:

1. Negates the need for legislation to release government spectrum.
2. Increases demand and keeps prices up.

Event 14 - Dingell Bill

The positive impacts of this event are:

1. Will increase the likelihood of PCS/PCN development.
2. More spectrum will increase interest in a super battery.
3. Increase the interest in smaller portable phones and safety assumptions.
4. Slightly increase the likelihood of cost reduction.

The negative impact is:

1. Reduces the need for development to enhance or compress the spectrum.

With the exception of Events 1 (RF Availability) and 2 (Dingell Bill), which somewhat offset each other, the "actor" events, should they occur, will significantly impact the issue in terms of how quickly the emerging PCS technology hits the market. The event evaluation medians of the Delphi panel (Appendix B, Table 3), forecast a probability between 60% and 95% that all the events will occur within ten years. However, the event evaluation ranges (Appendix B, Table 4) suggest all the events, except the major earthquake (forecast at 40-95% probability) and radio frequency availability (forecast at 40-75% probability), will occur by to the year 2000. With the knowledge that PCS is definitely on the horizon, law enforcement agencies should begin to address the policy implications.

The "reactor" events and trends, those events and trends most subject to impact by particular events, were even. The percentage change average was used to determine their order of importance. (See Appendix B)

Event 7: Personal Communication Networks
Event 14: Dingell Bill
Trend 7: Safety Assumptions
Trend 8: PCS Use
Trend 4: Size of Portable Phones
Trend 9: Cost of Personal Portable Communications
Event 2: RF Availability
Event 4: Super Battery

Due to their importance and sensitivity to change, each of these reactors can be significantly impacted by appropriately timed law enforcement policy.

Scenarios

The data generated from the trend and event forecasting, the cross-impact analysis, and information gathered from interviews and research was employed to develop three scenarios that look into the future of a medium-size police department in the fictitious city of Otter Bay. This model was selected due to the large number of cities and law enforcement agencies of this size.

A community located on the central coast of California, Otter Bay is the hub city of an area known internationally for its natural beauty, climate and recreation. The residents of Otter Bay number approximately 40,000, however as the physical and commercial center of the area, the daytime population is closer to 80,000. Otter Bay is a charter city operating with a council / manager form of government. The city manager is Fred Bohn. Fred is the former assistant city manager appointed in 1997 to his current position after the unexpected death of Linda Smith.

The principle source of revenue for Otter Bay is tourism. The city is financially sound due to it's 12% transient occupancy tax on accommodations and sales tax revenue from the many shops and stores. A world renown aquarium attracts over a million and a half visitors a year. The city operates a convention facility and aggressively solicits small to medium conferences and trade shows. A strong military presence, with two facilities located within the city limits and a large facility nearby, keep the economy stable. In the late eighties and early nineties the city was able to return a portion of the tax revenue to its citizens through enterprise funds in the form of neighborhood improvements, a community swimming pool and sports facility, and park development. Otter Bay residents are predominantly

caucasian, affluent, and stable. Service industry workers generally live in several neighbor communities where the hosing costs are considerably less.

Otter Bay Police Department has 75 employees, 55 of those are sworn police officers. The police department's annual budget is slightly over 4 million. Chief Jim Chandler has been the police chief for eight years. He was a former OBPD lieutenant selected by Linda Smith after a state-wide recruitment. He had succeeded Andy Anderson who was now the police chief of Pasadena.

Traffic is Otter Bay PD's biggest problem followed closely by victimization of the visitors to the area. Robbery, rape, burglary and thefts have recently increased dramatically in the commercial areas. Almost all the victims have been tourists.

Exploratory "Play Out" Scenario

BRUTAL RAPE ON RECREATION TRAIL - Call for Help Goes Unanswered The Otter Bay Herald, January 1, 2000. A 21 year old female student from Los Angeles was brutally beaten and raped by two men while her companion frantically called for help. David White, also from Los Angeles, claims Otter Bay police never responded to his panicked cry for help made on his personal phone. White and his fiancee were attacked on a brightly lighted section of the trail near the wharf at approximately 1 AM. White was able to escape and tried to call the police on his "flap-fone". When he got no response from the panic button, he called the satellite service operator and was told to turn on his locater. He was then told the police were on their way.

With his location indicator flashing, White helplessly watched from his hiding place while his girlfriend was raped and nearly murdered. Today, his fiancee was in guarded condition at Community Hospital while the two suspects remain at large.

Otter Bay Police Chief Jim Chandler claims his department never received Whites call for help. Chandler stated his officers were first notified by a passing bicyclist some 15 minutes after White claims he called. Chief Chandler said his department did receive a recorded "help me" with grid coordinates corresponding to Whites location, however that call was some five minutes after they had been called by the bicyclist. The bicyclist, a local, using a low-power microcell personal phone was able to call 911 with no apparent problem. Officers were on the scene within a minute only to find the injured victim. A search of the area failed to locate the suspects who also stole the victims folding satellite phone, valued at $500.

According to White, both phones were Christmas presents from the victim's mother. He said her mother had given them the powerful phones because of the wide-area emergency locating features.

Chief Chandler says his communications center cannot receive the satellite relays directly. He believes the delay was probably caused by overcrowding of the radio frequency used to relay the call. He explained, "When it's busy, calls are bundled into digital bursts and held until a central computer can find frequency space and then delivered. This length of time is unusual, but it was New Year's Eve and as busy as I hope we ever get this century."

Chief Chandler stated his department only recently upgraded to the older PCN microcell standard that allows local 911 calls to be traced to a building when the signal is indoors or within 100 meters outdoors. The Chief said it is increasingly difficult to stay up with PCS technology . . . . . .

Jim Chandler stopped reading and gazed out the window toward the city managers office. "Bohn's going to be all over me on this one, especially with the base closing and now another tourist." He scowled at his patrol captain. "Christ, where was your bike patrol, Dave?" Dave Fowler reddened and replied, "Chief, do you know how many phony "help me" calls we had? Even on our little PCN? Those guys chased bogus blips all night long. You got to do something about this crappy phone system." No kidding, thought the chief. "It's all I can do to stay up with the personnel issues, much less the new technology. I should have retired two years ago."

Normative "Desired and Attainable" Scenario

* OTTER BAY CELEBRATES THE NEW CENTURY * Revelers Pack the Beach, Wharfs, and Streets for Centennial Fireworks Show * Police Report No Major Problems The Otter Bay Herald, January 1, 2000. An estimated 100,000 people flocked to Otter Bay to celebrate the new century last night and into the wee hours of this morning. Police report no major problems except a massive traffic gridlock that lasted some four hours.

"We were prepared," said Chief Jim Chandler. Otter Bay Police Department augmented its force by 100 officers, brought in from as far away as Santa Clara and San Luis Obispo counties, for the largest celebration between Los Angeles and San Francisco. The police department also coordinated the efforts of some 250 community volunteers. The Chief praised his officers and the volunteers for

their efforts. "They were great!," he said. "Our communication systems were flawless. The state-wide California Emergency Law Enforcement Personal Communication Network, or CELE-PCN, allowed us to communicate directly with all the different law enforcement agencies. That system also allows us to program all the civilian volunteer phones, so the operations center can talk to them, too," he said. "The systems ability to call every phone working this event at the same time is a major advantage. We can update everyone on the net at the same time without tying up the police radios." Chief Chandler stated officers arrested 57 offenders between .....

Side bar: The CELE-PCN is the result of the 1996 Pomona Earthquake that devastated law enforcement and emergency communications in southern California. Three years in development, it is used exclusively by California law enforcement but has the ability to link with the parallel fire and emergency management systems. It is the largest private personal communication network in the world. CELE-PCN was funded over three years through the 1996 Emergency Communication Initiative. That initiative, passed seven months after the Pomona quake, added a one cent surcharge to the state sales tax for five years with long term operating costs to be funded by a PUC surcharge on telecommunications users.

The system is the result by a bill signed by Governor Wilson in 1992 that requires all owners and operators of wired and wireless telecommunication systems in California to have a common air interface (CAI) protocol and dedicate a portion of their system for emergency use. The federal Emerging Telecommunications Act of 1991, freeing 200 MHz of military spectrum for civilian use, the cellular transition to digital, and breakthrough technology to compress and spread the radio frequency spectrum all played a part in the CELE-PCN development. However, it wasn't until 1994, when Yokomizo Corporation's Super Battery was released, that the technology became practical.

During the 1998 dedication ceremonies Governor Wilson lauded California law enforcement leaders for their foresight in the early nineties. Law enforcement groups, led by the California Police Chiefs Association, lobbied hard for the enabling legislation. Strong opposition from the communication industry focused on a "Big Brother" theme but infighting among the early wireless developers eventually caused the opposition to collapse.

The network is a seamless wireless telephone service that, through the CAI protocol, links with all the wired and digital wireless cells, including the private

micro (1000 meters), and pico (100 meters) cells, located throughout the state. In urban areas, the many private systems (both micro and pico) allow the network to work as well indoors as out. Forty two mobile computer aided interconnected switchboard vans, that also carry the 800 mhz state-wide emergency radios (CLEMAX), can be fully operational anywhere in the state in under an hour.

Fred Bohn rubbed his eyes as he finished the article. He had been up nearly all night keeping tabs on the centennial celebration. He thought about the mayor and the council presiding over their "grand party" and wondered if they had any idea how much effort and money it had cost. He wondered if Jim had made to bed yet. He had left the chief talking on his personal "bat phone" at the corner of Beach and Sea Foam at 4 AM. A Japanese wire service reporter had seen Jim do a CNN spot on the crowds at the fireworks, cross-queried his name in some database and had come up with his personal phone number. Fred had told Jim he should have turned that phone off. He already had the CELE phone, a city phone and a radio shoved in various pockets. Fred smiled, remembering they had both turned their city phones off after Councilwoman Smith called wondering if she could "catch a ride to the festivities". Some things never change.

Hypothetical "What if..." Scenario

CALIFORNIA JOINS MOTOROLA IN COMMUNICATIONS JOINT VENTURE USA Today, June 26, 1994. In Sacramento today Governor Pete Wilson announced the State of California and Motorola Inc. had formed a partnership. The historic agreement between a state government and a communications industry leader will provide California with worldwide radio telephone service through Motorola's Iridium satellite system.

Iridium is comprised of 77 low-earth orbit satellites that will provide continual coverage across the earth's surface to a height of 100 miles. The 4 billion dollar project, first announced by Motorola on June 26, 1990, is expected to be operational during the first quarter of 1996. Test launches began in 1992, with commercial deployment beginning in September of this year.

California will provide up to a billion dollars over five years to complete the project. A spokesperson for Motorola told USA Today the satellite system became technically and economically feasible with legislation in 1991 that reclaimed under-used frequency spectrum from the federal government. Spectrum space with enhancements pioneered by the company will allow Motorola to greatly increase

the capacity of the system, thereby increasing the services it can offer. Some services already planned in addition to radio telephone are video conferencing, high definition television, secure emergency communications, mapping and tracking, and voice recognition programming.

California, the fourth largest exporting "country" in the world, hopes to take advantage of these services to further enhance its position. Initially, use of the system will be expensive with pocket size phones costing $3000 and air time $3 to $4 per minute. Under the agreement Motorola, as the sole supplier of the hardware and the system, will sell the equipment to the state. The state, as regulator through the PUC, will then offer the phones and other devices to the public in a lease / buy program at greatly reduced prices.

Motorola benefits by being able to offset the start up costs by 1 billion. It also is assured of a major penetration in the personal phone market. California hopes to recoup a portion of its costs through import and export duties and use the system to market itself , thereby assuring California business keep its competitive edge.

Did California get a good deal? Governor Wilson thinks so. During his speech on the steps of the capitol, the Governor also disclosed the Iridium system would eventually replace the multitude of different wireless communication systems currently being used by state and local government employees. A five year implementation plan, starting first with secure state and local law enforcement telecommunications, will eventually allow every government employee in the state to carry a satellite-based personal phone.

"Think of it," said the Governor, "a communication system that is absolutely impervious to land-based disaster. During any emergency we will be able to carry on the business of government. Use your imagination, the possibilities are endless."

A top law enforcement official, speaking on behalf of the California Police Chiefs Association - the group credited with first suggesting the alliance, commented on the abilities of the system. "The personal telephone has already changed the way we police. Our officers using PCN systems are able to take all the resources they use with them into the field. But the phones aren't secure and don't have anywhere close to the features of this system. They are all separate and require vulnerable land relays. With Iridium, an officer in the middle of the desert will be able to fax a scanned fingerprint directly to DOJ for an identification and never touch the land transmission systems. Any police officer will be able to talk to any other officer anywhere in the state. The system will allow us to know precisely

where our people are at any time so we can use them to the best advantage. At some point in the future every citizen will have this type of communication. When that happens, we will be able to wipe out crime, as we know it today."

To a reporters comment about "big brotherism", the police official replied, " That"s what the on / off switch is for."

Policy Implications

As noted earlier personal communication systems in one form or another are forecast to occur before the year 2000. The scenarios, while simplistic in detail, posit significant changes in the way we will communicate over distance. Law enforcement has an opportunity to make these changes positive and beneficial to the profession if it will act now. The suggestion is then, that law enforcement, through policy considerations, must act to "push" the emerging personal communication technology rather than allow ourselves to be "pulled" by it. This is particularly true of small and medium law enforcement agencies who historically, due to market considerations, are the last to benefit from major technological advances. To that end, the following policies are suggested for consideration:

Policies

1. Law enforcement agencies should plan to be early adopters of PCS.
2. Law enforcement agencies should develop awareness training on cellular and other migration paths that are evolving into true personal communications.
3. Law enforcement agencies should take the lead in educating local government decision makers in the possibilities of PCS.
4. Law enforcement agencies should push to organize PCS technology committees in state and national law enforcement groups like the California Police Chiefs Association, California Sheriffs Association, California Police Officers Association and the International Association of Chiefs of Police.
5. Through the auspices of the above groups, law enforcement agencies should support and lobby for favorable PCS legislation.
6. Law enforcement should begin to plan how they will deliver their services utilizing PCS technology. What opportunities can PCS offer? What problems can be expected?

In the next section, a model strategic management plan is developed for a medium-size police department to chart a course for the transition to the PCS future.

PART TWO

STRATEGIC MANAGEMENT PLAN

PART 2: STRATEGIC MANAGEMENT PLAN

The normative "desired and attainable" scenario is used to develop a strategic management plan. The model for a medium-size law enforcement agency is the fictional Otter Bay Police Department described in the Part 1 and used in the first two scenarios.

The objective of the strategic management plan is to define those strategies that could be implemented by Otter Bay PD to take advantage of the positive aspects of the emerging PCS technology. It will also attempt to identify and mitigate potential problems that may be created by PCS.

Situational Analysis

The first order of business in developing a strategic management plan is a situation audit. The WOTS-UP methodology (Weaknesses, Opportunities, Threats, and Strengths - Underlying Planning) was used to establish a framework to audit Otter Bay Police Department's situation. This process analyzes the opportunities and external threats to Otter Bay Police Department pertaining to the issue of the impact of PCS. It then assesses the department's internal capabilities, both strengths and weaknesses, to achieve the desired future.

External Opportunities

Opportunities are defined as: Any promising or beneficial situations in an organization's environment. The opportunities external to Otter Bay Police Department have been identified as follows:

1. The City of Otter Bay is financially sound.
2. The existing city telecommunication system is old and outdated.
3. A positive political climate exists in Otter Bay.

External Threats

Threats are defined as: Those unfavorable situations in an organization's environment. The external threats to Otter Bay Police Department were identified as follows:

1. The city of Otter Bay is somewhat remote from major economic centers.
2. The police department's radio communications are handled by the county.

3. Community ignorance of the PCS issue.
4. No one department in the city is responsible for telecommunications.

Internal Strengths

Strengths are those resources or capabilities an organization can use to effectively reach its objectives. The strengths of the Otter Bay Police Department are:

1. A strong management team and a creative leader.
2. Police Chief is active in California Police Chiefs Association.
3. The department is innovative.
4. The police department has an on going training program that can address the PCS awareness issue.
5. The department is currently studying its communication needs.
6. Three of the seven managers are in the POST Command College.

Internal Weaknesses

Weaknesses are those limitations, faults, or defects in the organization that could keep it from reaching its goal. The weaknesses of Otter Bay Police Department are:

1. Apathy towards innovation at the supervisory and line levels.
2. Budget constraints for new programs.
3. The department may not have the time or resources to be effective.
4. By itself, the department has limited political clout.

The WOTS-UP analysis is useful in understanding where an organization should position itself to match distinctive competence with opportunities and ward off threats by compensating for existing weaknesses.

Organizational Capability Analysis

The capability analysis is an assessment and documentation of the model organization's capacity for change relative to the issue. The organizational capapability analysis serves as overall climate check and attempts to rate the potential capability of the organization for successfully coping with the policies and strategies necessary to positively impact the PCS issue. Otter Bay PD's organizational capability was assessed from three perspectives: Management, overall organizational climate, and overall organizational competence.

Assessments of those capabilities in the three categories are reflected below in Chart 1.

Chart 1
Organizational Capability Analysis

Otter Bay Police Department - Organizational Capability Relative to PCS

Evaluation Criteria:
5 - Superior. Beyond present need.
4 - Above Average. Can accept the challenge.
3 - Average. Equal to the need.
2 - Below Average. Could be better.
1 - Poor. Will need improvement.

Organizational Category:	Capability				
	1	2	3	4	5
Police Management					
Education /Training					X
Personality / Talent				X	
Innovative / Goal Oriented				X	
Organizational Climate					
Culture / Norms			X		
Rewards / Incentives		X			
Structure / Followership			X		
Organizational Competence					
Budget / Resources			X		
Self-Esteem / Respected			X		
Supervisory Competence		X			
Line Competence		X			

The results of this assessment are:

1. Management is viewed as well trained, educated and innovative They have the skills necessary to plan and sell a strategic response to emerging PCS technology.
2. The organizational climate is suited to some change but will require careful marketing during the transition. The POA will need to be assured there is something in it for them.

3. The overall organizational competence is questionable. The organization, by itself, does not have the resources to impact the issue.

Strategic Assumption Surfacing Technique

Organizational policy decisions generally have an impact beyond the defined group. The Strategic Assumption Surfacing Technique (SAST) was used to "surface" potential entities or individuals who may have an interest in this policy decision. To apply this technique groups or individuals are considered stakeholders or snaildarters.

Stakeholders: These are individuals, groups or organizations that have an interest in the impact of PCS. They may be affected by what OBPD does with regard to the issue, might be able to impact it themselves, or have some interest or concern.

Snaildarters: Are stakeholders who are unexpected, or believed to be insignificant, yet could dramatically influence policies, generally negatively.

A list of potential stakeholders most likely to influence the issue was generated. The list contains some snaildarters (**SD**):

1. Police management
2. The City Manager
3. The City Council
4. Police association (OBPOA)
5. Media (**SD**)
6. Local cellular providers (**SD**)
7. Pacific Bell
8. California Office of Emergency Services (OES)
9. California Police Chiefs Association (CPCA)
10. California Peace Officers Association (CPOA)
11. PCS developers
12. U.S. Congress (**SD**)
13. California Commission on Peace Officers Standards and Training (POST)
14. Federal Communication Commission (**SD**)
15. ACLU (**SD**)

Once a list of stakeholders and snaildarters is generated, it is necessary to make certain issue-related assumptions that reflect the nature of each

stakeholder's concerns and desires. (See Appendix C for SAST map and methodology.)

Identified Stakeholder Assumptions:

Police management:

1. Wants to provide quality services.
2. Supports innovation in PCS technology.
3. Believes it is capable of educating local decision makers on PCS issues.
4. Willing to organize PCS technology committees in professional law enforcement groups. Willing to be a champion.

City Manager:

1. Will be sensitive to City Council.
2. Is open to new ideas.
3. Will be cost conscious.
4. Will support the police department.

City Council:

1. Sensitive to community needs and safety issues.
2. Supportive of OBPD efforts to provide quality services.
3. Will be responsive to political pressure.

Police Association (OBPOA)

1. Will be looking out for its members.
2. Somewhat resistant to change.
3. Values good communications.

Media (SD)

1. Will be looking for a story on emerging trends.
2. Unpredictable with potential hidden agendas.

Local cellular providers (SD)

1. Profit motivated.
2. Will demand equal treatment.

Pacific Bell

1. Will be aware of public relations.
2. Publicly traded and able to influence on a large scale.

California Office of Emergency Services

1. Has state-wide responsibility and political clout.
2. Will be sensitive to disaster issues involving PCS.

California Police Chiefs Association / California Sheriffs Association

1. Politically strong.
2. Ties with CPOA and IACP for networking.

California Peace Officers Association

1. Comprised of mostly law enforcement upper and middle-managers.
2. Excellent networking and ties to CPCA.
3 Politically strong with legislative ties.

PCS Developers

1. Profit and survival motivation.
2. Will resist regulation.

U.S. Congress (SD)

1. Subject to compromise and separate political agendas.
2. Nationally sensitive to global issues.
3. Slow to act.

POST

1. Will support law enforcement groups.
2. Can provide funds for training and research.

Federal Communication Commission (SD)

1. Strongly influenced by the communications industry.
2. Tremendous power over the issue.
3. Slow and cautious.

American Civil Liberties Union (SD)

1. Can be counted to oppose any threat of government control.
2. Will support individual rights over any perceived benefit of PCS.
3. May not address the issue during early development.

The assumptions of the stakeholders are critical and should be considered in the development of specific policies to construct broader strategies. The certainty of these assumptions (the purpose of the SAST map) indicates importance relative to the issue. At the same time reasonable strategies should consider the needs of all the stakeholders, including the snaildarters who are the most likely groups to generate unexpected responses to the strategic management plan.

Mission Statement of the Otter Bay Police Department

The macro or overall mission statement defines the operation of an organization. It is the basis for all decisions and strategies. It directs behavior, expresses values, builds commitment, and ensures consistency. The mission statement of the Otter Bay Police Department is:

> Otter Bay Police Department exists to serve and provide for the security needs of the community. The Department strives to maintain high ethical and professional standards in the fair and just enforcement of the law of the land. The Department is committed to excellence and will constantly search for a better way in which to deliver its services.

To focus on the issue of this futures study a micro-mission statement has been developed for the Otter Bay PD. It is:

> The Otter Bay Police Department will encourage development of PCS in an effort to better serve the community through advanced wireless technology.

Strategy Development

In order to execute the PCS mission statement of the Otter Bay Police Department a number of strategies will be required. Some have already surfaced at the end of the futures forecasting section; others have been suggested during informal conversations with subject matter experts and law enforcement managers. They are:

1. To develop and implement internal training on wireless telephonic communications.
2. Select a PCS champion from top management.
3. Develop and implement a PCS education program for the community.
4. Seek out and acquire examples of PCS technology.
5. Organize a blue ribbon committee of community and local law enforcement leaders to explore the possibilities of PCS.
6. Become PCS activists and organizers in state-wide law enforcement groups.

As noted earlier, strategies should be examined for stakeholder implications in an effort to address the assumed needs and to mitigate potential snaildarters. The suggested strategies are individually tested below:

1. To develop and implement internal training on wireless telephonic communications. Will build support and commitment within the members of the POA. Sends a clear signal management supports the PCS mission. Internal training development will serve as the foundation for the community education program. It can also be used as a vehicle to involve the media, local cellular providers, PCS developers, POST, and Pacific Bell.

2. Select a PCS champion from top management. Since the strategy relies on communication and interaction with various law enforcement groups the police chief should be the standard bearer. Also, the chief can, through his office, have a positive impact on virtually all the stakeholders. A secondary champion, perhaps a lieutenant, may be valuable as an assistant to the police chief.

3. Develop and implement a PCS education program for the community. This policy is envisioned as a several tier program beginning with media spots on how citizens should use portable telephones when calling for assistance. It should then evolve into the possibilities of PCS during disasters. This is a sensitive area that will require a program manager to carefully involve the stakeholders over a period of time.

4. Seek out and acquire examples of PCS technology. Should attempt to follow the timing of the community education program with attention to the city manager and the city council who control the funds. Management should seek input and buy in from the POA. Contact with PCS developers should be initiated. There is a potential for lend / test programs with developers and providers of new systems.

5. Organize a blue ribbon committee of community and local law enforcement leaders to explore the possibilities of PCS. Careful selection is critical. This is an excellent opportunity to draw in a snaildarter or two. Representatives of the media, and the ACLU could be appropriate, along with representatives of other stakeholder groups. Members should be drawn from as broad of the community spectrum as practical to ensure wide support. The police chief as champion may wish to chair the committee.

6. Become PCS activists and organizers in state-wide law enforcement groups. This is another function for the champions. It will require

acquiescence from the city manager and support from police management as the champions will occasionally need to be away from the organization. The champions should not underestimate the value of other members of the organization in this activity. Any positive outside contact relative to the issue can be beneficial.

In this testing process, management should also consider the down-side of each strategy which has been alluded to in the form of cautionary statements such as "carefully" and "sensitive."

Implementation Strategy

In order to implement the recommended policies to push PCS, consideration must be given to the external environment of Otter Bay Police Department (opportunities and threats), the department's internal capabilities (strengths and weaknesses), and the stakeholder assumptions. Evaluation of the six strategies suggested indicates all are viable. Each can be implemented at the local level with minimal initial funding. Although all the strategies would not be implemented at the same time, they are all feasible within a one year time-line. Since this effort assumes no particular end state, Otter Bay Police Department is merely focusing on a desired PCS future that, over a period of time, will allow the department to better serve the community.

The City of Otter Bay uses the two year budget process. A new two year budget will commence with fiscal year 1991 /1992 on July 1, 1991. A January 1, 1991 target date to begin implementation would be sufficient for the minor budget preparations required. Actual start-up should begin with the fiscal year. A continual planning system needs to be implemented to ensure the viability and success of the proposed policies. A system to assess policy progress on a quarterly basis is suggested. New strategies or changes in policies would be evaluated and, if needed to accomplish the department's micro-mission, could be implemented during the following quarter. Implementation tactics are discussed further in Part 3: Transition Management.

PART THREE

TRANSITION MANAGEMENT PLAN

PART 3: TRANSITION MANAGEMENT PLAN

The strategic management plan in Part 2 is only the "road map" to get from where you were to where you are today. Once the decision to implement the strategic plan is made there must be a management structure to motivate and guide the transition from the present to the planned future state. The transition management plan is the map to get you from you are today to where you want to go in the future. It ensures that proper consideration is given to important details during transition; it ensures appropriate structure and accountability. The plan will identify critical-mass members; assess their commitment, responsibility and readiness; and indicate organizational needs.

Critical Mass

The critical mass is the smallest number of individuals or groups whose support is necessary for successful implementation and whose opposition likely means failure. Identification of the critical mass is a function of the issue champion.

In the model, the following members or groups make up the critical mass necessary for the Otter Bay Police Department to be successful in its micro-mission goal.

1. Police Management
2. City Manager
3. Otter Bay POA
4. City Council
5. California Police Chiefs Association / California Sheriffs Association
6. California Peace Officers Assn.
7. POST

Once identified the critical-mass members must be analyzed to determine those actions necessary to change or influence their current positions. An analysis of each members capability and readiness was undertaken below:

Police Management - Without the commitment of the Police Chief and the top management it would be impossible to initiate the desired change. The Chief must be the champion of the mission. He is highly respected in the local community and in the key law enforcement groups. His leadership is critical within the organization. The management team will follow the police chiefs lead. He is

the direct link to the city manager and the city council; however he must have the commitment of the whole organization.

City Manager - The support of the city manager is essential for the successful implementation of the PCS strategy. The city manager has control over the police department's budget and will need to influence the city council. The city manager also has some control over staffing in the department. His consent will be needed for the chief and management staff to occasionally be away from the city building support with the various law enforcement groups.

Otter Bay Police Officers Association - The commitment of the POA is seen as critical to the success of the micro-mission. While the PCS issue will probably not affect working conditions, any change will be viewed with suspicion and must be carefully handled by the management team. The process of change must be viewed as beneficial by POA members.

The City Council - Members of the city council are currently apathetic to the PCS issue. They must be convinced of the importance as their support is critical. They are most responsive to local political and community pressure. Each member will need to pushed carefully by the city manager and police management. Safety and disaster preparedness may be appropriate vehicles to build commitment.

California Police Chiefs Association and California Sheriffs Association - Since the strategy relies heavily on wide-area political pressure, the commitment of Cal Chiefs to support PCS development is essential. The Otter Bay Police Chief must be prepared to spend considerable time lobbying the CPCA board and various influential members to take a pro PCS position. Once gained, CPCA support must be directed towards the favorable legislation needed.

California Peace Officers Association - CPOA support is needed for the same reason as CPCA. Commitment from this highly influential group sends a message to middle managers and line officers throughout the state and validates the CPCA stance. Again, the CPOA efforts will need to be directed toward favorable legislation.

California Commission on Peace Officer Standards and Training (POST) - The mission for POST in this endeavor is again support. POST could be asked to support legislation as well as develop state-wide acceptable PCS standards. POST certified training on current as well as future PCS could be developed using the model designed by Otter Bay. Since POST represents the certification of all California peace officers, its commitment would lend considerable influence.

The next step was to determine the necessity of increasing any critical mass member's readiness or capability.

Commitment Planning

Commitment planning is a strategy to secure the support of the critical-mass members who are vital to the effort. A commitment chart rates the present level of commitment and the level of commitment needed to make a particular change (the strategies recommended in Part 2). The following chart reflects the commitment of the critical mass individuals.

Chart 2
Commitment Plan

Critical Mass Members	No Commitment	Let it Happen	Help it Happen	Make it Happen
Police Chief				XO
Management			X →	O
City Manager		X →		O
Otter Bay POA		X →	O	
City Council	X →		O	
CPCA	X →			O
CPOA	X →		O	
POST	X →		O	

X = Current State O = Desired State

Chart 2 clearly shows a major amount of work needs to be done. No one in the critical mass can be allowed to remain in the "no commitment" area if the strategy is to succeed. It may be possible to address the commitment of all the critical mass members at the same time but more than likely the "domino" approach may be more effective. The commitment of one may "help happen" the commitment of another.

Commitment Strategies

There are a number of possible intervention strategies that can be employed to overcome resistance and thereby create the required level of commitment. The critical mass members in Chart 1 are prioritized in their order of importance.

Police management, because they will have a substantial part to play, need to be moved from "help it happen" to "make it happen". Some techniques that could be employed include: Persuasion, role modeling, a reward system and forced collaboration. Due to the number of individuals involved all these techniques may need to be used because without police management pushing PCS the POA could not be moved.

The city manager and the city council have interests far beyond the police department. By the very nature of their positions they are natural change agents but with far greater responsibility. It is suggested they both be moved by attaching the PCS issue to other areas such as, disaster preparedness, improving an aging communications infrastructure and perhaps even methods to promote the council's political position. The blue ribbon committee suggested in Part 2 is an excellent avenue to secure support indirectly.

The Otter Bay POA can be drawn into the "help it happen" area by involvement. They will need to be assured that their basic needs are not threatened and since they are not being required to "make it happen" they will not appear to be too strongly on the side of the police chief and police management.

CPCA,CPOA and POST are the last in priority whose support is needed. By moving to change their commitment last, the change agents are fairly focused and have their program well started. Elements of the internal training can be offered at association seminars and training sessions. Industry contacts can be asked to intervene with selected officers of the various groups. Essentially, Otter Bay should have their strategies well thought out prior to contacting outside organizations. External commitment must be perceived as for the good of the total law enforcement community if legislative intervention is to be expected.

The Transition Management Team

The formidable task ahead will require its own management structure. A transition management team, appropriate to accomplish the tasks, should be established. Since the police chief is the primary change agent, the process may be better served by not totally relying on his leadership to make it successful.

Since this is a small organization with only seven managers, it is assumed the police chief will have already isolated his key personnel. Those individuals need to be capable and ready to help and should share the leader's vision of the future. Since the total involvement of the department is desirable, line and supervisory personnel may also be considered.

In the Otter Bay Police Department the transition team would likely include the police chief, the administrative lieutenant, the civilian business manager and the relief sergeant.

Transition Management Methodologies

The transition management team must build a climate for success, avoid surprises, make plans well known in advance, provide empowerment to others, support innovation, and at the same time maintain control. Change can be uncomfortable. It can be stressful. The transition management team must do all it can to emphasize the positive and minimize the negative.. The following transition technologies may be useful to a police department similar to Otter Bay PD.

Responsibility Charts

Responsibility charting is useful in placing responsibility for action steps. Sometimes known by the acronym, RASI* Chart (taken from the letter classifications that represent a decision or action taken)[8]; the chart fixes levels of *responsibility, approvals, support, informs,* or is *irrelevant* (*) to the particular action. A brief example follows:

Chart 3

RASI * CHART

Decisions / Actions	Actors: Chief	Admin. Lt	Bus. Mgr.	Relief Sgt.
Internal Training	s	a	s	r
PCS Sampling	i	r	a	i
Blue Ribbon Com	a	r	i	s
Community Educa.	s	r	s	s
CPCA	r	i	*	i
Liaison /City Man.	r	*	s	*
Work w/OBPOA	i	i	i	r

R - Has responsibility for an action, but not necessarily authority.
A - Must approve and has power to veto the action.
S - Must support and provide resources regardless of support.
I - Must be informed or consulted before action but cannot veto.
***** - Irrelevant to the particular action

Chart 3 demonstrates some of the actions that might be taken by the transition management team to encourage development of PCS in Otter Bay.

Team Building

Team building is a natural for a transition management team. When a new transition structure is organized there is a certain amount of uncertainty regarding roles particularly if the chief executive is involved. Team building uses a structured communication process to help make sure all parties are working toward the same goal. It may be useful to use a modified team building process at checkpoints along the way to gather and evaluate feedback.

Mile Posts

Every good road map has distance markers and checkpoints to aid the driver in knowing if he is on course and on time. A transition team can use the same methodology to ensure the implementation strategy is on track. In an

eighteen month program, such as Otter Bay's micro-mission, mile posts could be established at two month intervals. That frequency is appropriate in this case because of the logical order in which the process must occur.

Feedback and Evaluation

Whether it's done during team building sessions, at mile posts, or at some other point, feedback and evaluation processes are absolutely essential. It is too easy for a group fostering and promoting a vision to lose track of the real world. People outside of the transition team should be brought in to provide occasional "reality checks".

Summary

The object of this transition management plan is to assist with the implementation of the policies developed in the strategic planning (Part 2). Careful attention to transition management can help mitigate the problems and disruption that are bound to occur during a change process.

This transition plan as well as the strategic management plan are deliberately abbreviated and without great detail in order that they can be adapted to the specific needs of a medium-size police police department seeking to accomplish a similar micro-mission within their community. There are many other methodologies that could be employed to affect a similar goal; some of the processes used could be eliminated. No matter what methodologies are employed, the fast-moving world of advanced technology, applicable to law enforcement, will demand careful and effective planning.

CONCLUSIONS

AND

FUTURE IMPLICATIONS

CONCLUSIONS AND FUTURE IMPLICATIONS

The purpose of this paper was to provide law enforcement with a macro overview of the future of wireless personal communications in California and in the United States. It is the author's belief our society is entering an era in which personal communications will play a significant role; an era in which we will completely pass from calling a location to calling an individual, anywhere, anytime, with no more effort than it takes to punch a few digits on a keypad or to voice a name or number. Members of the law enforcement community, long used to having instant communications via a police radio, may tend to overlook the significance of such a change. However, the same reasoning that says law enforcement would be hard pressed to perform it's mission without the police radio, can be used to help understand the driving forces behind personal communication systems. Wireless personal communication systems are currently providing the same sort of instant personal connectivity as that used by law enforcement for years; and providing the service to the business user and the general public at a price that is affordable to a major portion of the population. The ability to make quick informed decisions and to communicate instantly over distance is equally as important to a small business owner or a stranded motorist as it is to a police officer working a beat.

Innovators and early adopters of cellular telephones have grown from 5,000 subscribers in 1983 to 5.4 million today[9] . A steady decline in the cost of cellular service is opening the market to an increasing number of potential customers. Indeed, Motorola Communications and Electronics, Inc, has forecast that by the year 2000 there will be one billion telephone lines in service. Motorola believes wireless "tails" will be attached to 30-50% of these lines. The variety of wireless devices considered in making this forecast include cordless telephones, cellular phones, pagers, interconnected trunked mobile radio, and satellite based mobile radio[10] . Mobile personal communications, considered the 1980s symbol of power and status, by the year 2000, will be as common as the desk telephone of today.

Two macro viewpoints of how personal communications needs will be met in the future are emerging. The first view requires a large block of spectrum to provide a portable oriented, high capacity network with the ubiquitous wireless access and typically focuses on a single subscriber device which will be used in home, the office and on the street. The second view satisfies the customer needs by providing high level intelligence and interoperability which assures the

subscriber a great number of options and the ability to use the various network services in an integrated fashion to obtain a high level of personal flexibility.

In the United States, large blocks of unused spectrum are not yet available. Therefore, for at least the immediate future, the second vision is more credible because it accepts the continued evolution and enhancement of existing services rather than the wholesale substitution by a completely new service. As is the current case, loosely demonstrated by the futures forecast and the scenarios constructed in Part 1, there will be competitive overlaps to these services. User flexibility is the key criteria in the development of future personal communications systems. The ability to link the various networks together so that the service may be altered upon subscriber demand by the use of smart cards to alert a network to a person's location, thus enabling calls to be properly routed or services activated, is an example of user flexibility. For example a subscriber may program a network to do the following:

> From 7-8 am a call will be routed to the cellular portable and the call will be routed to voice mail if not answered within three rings.
>
> From 8-9 am all calls are routed to voice mail to allow for uninterrupted reading of mail. Specific originating numbers will ring at the desk phone.
>
> For the balance of the day calls are routed to the desk phone and then routed to voice mail if not answered in three rings.
>
> If the subscribers schedule should change, for example an out of town business trip, the subscriber could program the network to a cellular system covering the destination city.

Finally the use of voice recognition to program the network will significantly increase the flexibility and power of the service. Interestingly, today's telecommunications services can make this scenario a reality. It is not dependent on the release of additional radio spectrum. What will be more difficult will be installing the political and economic mechanisms to allow this to happen[11] .

So, what does this all mean to law enforcement? What impact will future PCS have on a medium-size law enforcement agency? What problems will PCS generate? What opportunities for law enforcement will future PCS offer?

The phenomenal growth of the cellular industry, the primitive precursors of personal communications to come, is currently rivaled only by the growth and market penetration of the now commonplace VCR. The author believes this growth will continue, and that the evolution of the hard-wired telephone to wireless cellular phones and the advanced systems of the future, will in some regards mean "more of the same" for law enforcement.

More calls for service by a public that can instantly summon help or report a crime in progress will call for a re-thinking of how police agencies respond to and prioritize those responses. For the same reasons law enforcement can deliver it's services in a prompt and timely manner due to it's communications, the citizen's ability to instantly connect will give rise to an expectation of instant response. The sheer mobility of portable personal communications poses significant jurisdictional and response problems. New laws and standards regulating how and when persons may use portable communications are already impacting police agencies. Traffic accidents involving cellular phone users are not uncommon. Complaints of disturbances caused by ringing portable phones and audible conversations in restaurants and theaters are issues suddenly being faced by law enforcement. There are privacy issues yet to be addressed. Little has been done to address the criminal use of personal portable communications, although it is widely agreed criminal types are early adopters of new technologies. The list of potential problems can go on and on. Careful reading of the scenarios in Part 1 will reveal numerous subtle inferences that might foretell a future problem for a medium-size police department.

The futures forecast portion of this paper clearly indicates advanced PCS technology will be a part of our lives within the study time frame. Law enforcement has a choice. It can allow itself to be "pulled" by the emerging PCS technology and react to the impending changes, or it can "push" the technology thereby enhancing it's service delivery and mitigate some of the potential problems.

It is the authors position law enforcement should take the optimistic pro-active approach and "push" PCS development. A single medium-size police department cannot, on it's own, be successful in an endeavor of this type. It could, however, as shown in the strategic planning section; by stepping out of it's traditional isolationist role, begin to marshal the kind of resources needed to impact a national (if not global) emerging trend. The opportunities for law enforcement, like the problems, and touched on by the scenarios, are limited only by one's imagination.

For example the current California problem of cellular "911" calls going to the nearest California Highway Patrol dispatcher, earlier promulgated on the premise that all cellular calls originate on a highway, should be modified as the number of users increase and the cells get smaller. Regulations requiring cellular and future PCS providers to route "911" calls to appropriate emergency dispatch centers within certain geographical locations may need the "push" of such groups as California Police Chiefs Association or The League of California Cities.

Requiring "hardened" and auxiliary power for cellular and future micro and pico cellular sites to protect the service during an earthquake or other disaster is another example of where a concerted law enforcement effort could be effective. Simple public awareness education on how to report an emergency using a cellular phone is another. The formation of state-wide committees in the various law enforcement organizations would help the smaller agencies stay abreast of developments in the communication industry, aid in developing standards for law enforcement, allow input in the emerging PCS technology, and provide the political voice to impact change. Like the potential problems, the law enforcement opportunities are limitless.

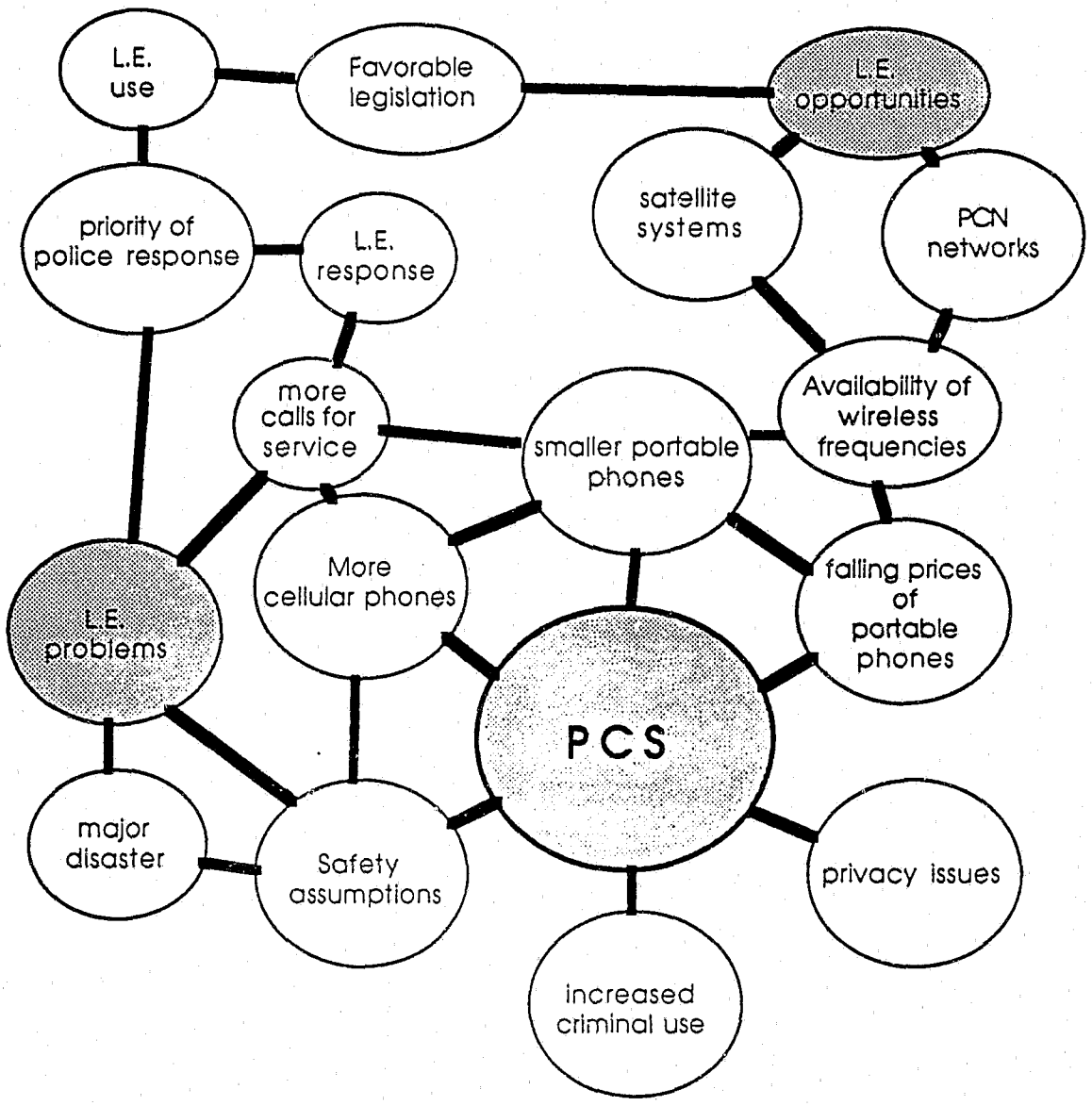
Other issues relative to the emerging PCS trend considered important to law enforcement and worthy of an in-depth study are: Personal portable communications and criminal activity; constitutional and privacy issues surrounding law enforcement use of PCS; secure PCS systems for law enforcement; the relationship of personal communications systems and the 800 MHz trunked radio system; and law enforcement's role in regulating private PCS use.

The examples above are only a few of the issues that could be addressed immediately. The rapid occurrence of some of the events forecast in the futures section could significantly speed up PCS development. Major technological breakthroughs could, within a few short years, lower prices to the point that market saturation will occur at an unbelievable pace further putting law enforcement at a disadvantage. Law enforcement should act now on this issue. It may very well be that a small or medium-size law enforcement agency will surface as the champion of this broad issue area. The author hopes future Command College students will further define the issue and perhaps accelerate the impetus for law enforcement to seize the opportunity to be a leader in a major social change that is bound to dramatically affect the way we operate.

APPENDIXES

Figure 1

FUTURES WHEEL



The Futures Wheel is useful to focus the issue and identify sub-issues.

MODIFIED CONVENTIONAL DELPHI PANEL

(October and November 1990)

1. Police Chief, medium-size police department
2. Patrol Sergeant, medium-size police department
3. Business Manager, medium-size police department
4. Captain, California county sheriff's department
5. Captain, large metropolitan police department
6. Technology consultant to law enforcement and business
7. Publisher, PCS and cellular newsletter
8. Reporter, national newspaper
9. Manager, communications industry leader
10. Manager, PCS industry
11. Editor, communications industry newsletter

Trends - Patterns of happenings over time that has an impact on the issue question.

T-1 Cellular Phones in L. E. - The use of cellular telephones in medium-size law enforcement agencies.

T-2 Work at Home - The number of Americans engaged in work at home or away from the traditional office using computers and communication devices.

T-3 Police Recruitment - The number of persons in the American workforce qualified as police applicants.

T-4 Size of Portable Phones - The physical size of wireless telephones.

T-5 Portable Phone Regulations - Portable phones are banned from certain public areas such as restaurants and movie houses due to public outcry over disruptions.

T-6 Availability of Wireless Radio Frequencies - The amount of space and competition for the radio frequency spectrum utilized for portable, cellular and other forms of wireless communication.

T-7 Safety Assumptions - The number of private citizens that assume their personal safety is enhanced if they have a portable telephone to summon help.

T-8 PCS Use - The number of citizens using portable wireless two-way communication systems (PCS).

T-9 Cost of Personal Portable Communication - The affordability of portable wireless two-way communications.

T-10 Level of Calls for Service - The number of calls for service per year received by a police agency from the citizens in the service area.

T-11 Fees for L.E. Services - Police agencies charge fees based on actual costs for non-essential services.

T-12 Qualified Emergency Dispatchers - The number of qualified emergency dispatchers in law enforcement.

T -13 Police Officer Availability - Defined as the time police officers are available to respond to calls for service.

Events - A discrete occurrence that may have a significant impact on the issue question.

E-1 Pt to Pt Telephone System. - Point-to-point telephone system. A satellite-based system is commercially available in the U.S. A call is transmitted directly to a satellite and then rebroadcast. The rebroadcast calls can be picked up anywhere in the contiguous 48 states.

E-2 RF Availability - Technology to compress or enhance the radio frequency spectrum to allow virtually unlimited radio communications is developed.

E-3 Pocket-Size Telephones - Pocket-size telephones are in widespread use. These phones communicate via satellite with a central switchboard and allow voice and digital communication.

E-4 Super Battery - A reasonably priced battery is developed with 10+ times the energy / density ratio of present batteries.

E-5 Personal Locating Devices - Widespread use of electronic devices that monitor movement and signal location of users. Could be used to control prisoners and parolees or locate lost children. Could also be used as an alarm to summon help.

E-6 Phone Numbers for Life - Social Security (or similar) numbers become phone numbers and once issued are used for life. Calls are received on any device the owner designates.

E-7 Personal Communication Networks - The nation would be blanketed by low-powered transmitters. A call sent from one phone to another would either travel from one transmitter to the next, or to a central switching system which would send it to another city. The system uses smart card encoding to locate the phone being called regardless of location.

E-8 U.S. Communications Consortium - Major U.S. corporations involved in communications band together and establish a standard for radio telemetry.

E-9 FCC Spectrum Fees - The Federal Communications Commission, in order to enhance development, charges hefty fees for use of the RF spectrum to discourage licensees from letting capacity go unused.

E-10 Electromagnetic Radiation Proven Harmful - Studies conclusively link low-level electromagnetic radiation to some forms of cancer.

E-11 Traffic Jam - Contention for spectrum space causes overloading and unacceptable interference for law enforcement and emergency services.

E-12 FCC Participation - The Federal Communications Commission allows numerous experimental licenses for "Personal Communication Systems" allowing PCS to become a reality.

E-13 Major Earthquake in California - A major earthquake devastates land-based communication facillities.

E-14 Dingell Bill - Emerging Telecommunications Technology Act (Rep. John Dingell Dem-Michigan) reallocating 200 mhz of military spectrum for civilian use is passed.

Table 1

TREND EVALUATION

PANEL MEDIANS

Trend #	TREND STATEMENT	LEVEL OF THE TREND (Today = 100) 5 Years Ago	Today	Five years from now	Ten years from now
4	SIZE OF PORTABLE PHONES* - Defined as the weight and size of portable two-way wireless communication devices.	200	100	50 / 50	40 / 25
6	AVAILABILITY OF WIRELESS FREQUENCIES - The amount of space and competition for the radio frequency spectrum utilized for portable, cellular and other forms of wireless communication	70	100	125 / 110	120 / 150
7	SAFETY ASSUMPTIONS - The number of private citizens that assume their personal safety is enhanced if they have a portable telephone to summon help.	30	100	150 / 150	175 / 150
9	COST OF PERSONAL PORTABLE COMMUNICATION *- The affordability of portable wireless two-way communications.	200	100	75 / 50	50 / 25
8	PCS Use - The number of citizens using portable wireless two-way communications.	25	100	200 / 175	250 / 400

(* On T-4 and T-9, larger numbers denote increases size or cost.)

"Will be" EXPECTED LEVEL / DESIRED LEVEL "Should be"

Table 2

TREND EVALUATION

RESPONDENT RANGES

Trend #	TREND STATEMENT	LEVEL OF THE TREND (Today = 100) 5 Years Ago	Today	Five years from now	Ten years from now
4	SIZE OF PORTABLE PHONES *- Defined as the weight and size of portable two-way wireless communication devices.	150-250	100	50-75 / 30-65	25-50 / 20-40
6	AVAILABILITY OF WIRELESS FREQUENCIES - The amount of space and competition for the radio frequency spectrum utilized for portable, cellular and other forms of wireless communication	50-100	100	100-200 / 50-300	25-250 / 25-350
7	SAFETY ASSUMPTIONS - The number of private citizens that assume their personal safety is enhanced if they have a portable telephone to summon help.	20-100	100	125-160 / 100-180	125-250 / 150-400
9	COST OF PERSONAL PORTABLE COMMUNICATION* - The affordability of portable wireless two-way communications.	200-250	100	30-75 / 25-50	20-50 / 15-25
8	PCS Use - The number of citizens using portable wireless two-way communications.	25-50	100	125-200 / 150-300	150-500 / 200-500

(* On T-4 and T-9, larger numbers denote increases size or cost.)

"Will be" EXPECTED LEVEL / DESIRED LEVEL "Should be"

Table 3

EVENT EVALUATION

PANEL MEDIANS

Event #	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 scale)	NEGATIVE (0-10 scale)
2	RF AVAILABILITY - Technology to compress or enhance the radio spectrum to allow virtually unlimited radio communications is developed.	5	25	75	9	1
14	DINGELL BILL - Emeging Telecommunications Technology Act (Rep. J Dingell, D-Michigan) reallocating 200 mhz of military spectrum for civilian use is passed (or similar legislation).	2	75	95	8	1
4	SUPER BATTERY - A reasonably priced battery with 10+ times the energy/density ratio of present batteries.	3.5	60	75	9	0
7	PERSONAL COMMUNICATION NETWORKS - The nation would be blanketed by low-power transmitters. The system uses smart card encoding to locate the phone being called regardless of location. (abv)	4	50	75	8	0
13	MAJOR EARTHQUAKE IN CALIFORNIA - A major earthquake devastates land-based comminication facilities in California.	4	50	60	8	5

Table 4

EVENT EVALUATION

RESPONDENT RANGES

Event #	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 scale)	NEGATIVE (0-10 scale)
2	RF AVAILABILITY - Technology to compress or enhance the radio spectrum to allow virtually unlimited radio communications is developed.	4-7	20-50	40-75	8-10	0-2
14	DINGELL BILL - Emeging Telecommunications Technology Act (Rep. J Dingell, D-Michigan) reallocating 200 mhz of military spectrum for civilian use is passed (or similar legislation).	.5-3	25-100	50-100	6-10	0-1
4	SUPER BATTERY - A reasonably priced battery with 10+ times the energy/density ratio of present batteries.	2-5	50-75	75-100	5-10	0-2
7	PERSONAL COMMUNICATION NETWORKS - The nation would be blanketed by low-power transmitters. The system uses smart card encoding to lacate the phone being called regardless of location.	2-7	20-90	50-100	5-10	0-2
13	MAJOR EARTHQUAKE IN CALIFORNIA - A major earthquake devastates land-based comminication facilities in California.	0-5	20-50	40-95	5-9	2-6

Table 5

CROSS-IMPACT EVALUATION MATRIX

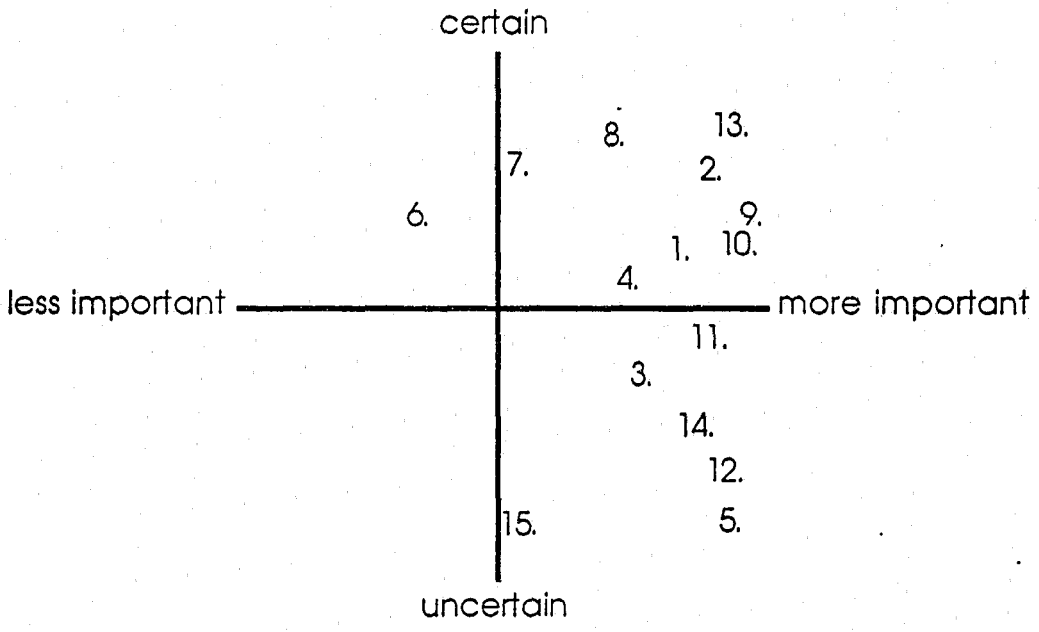
IMPACTING EVENT (ACTORS)	IMPACTED EVENT (REACTORS)					IMPACTED TRENDS (REACTORS)					IMPACT
	E-2	E-7	E-14	E-13	E-4	T-4	T-6	T-7	T-9	T-8	Event Impacts
E-2 RF AVAILABILITY		+70%	-25%	0	+25%	+35%	+20%	+20%	-20%	+20%	8
E-7 PERSONAL COMMUNICATION NETWORKS	+35%		+45%	0	+20%	+25%	-10%	+40%	-50%	+25%	8
E-14 DINGELL BILL	-40%	+80%		0	+25%	+20%	+80%	+20%	+10%	+20%	8
E-13 MAJOR EARTHQUAKE IN CALIFORNIA	+5%	+50%	+50%		+20%	-10%	+40%	+65%	-30%	+50%	9
E-4 SUPER BATTERY	+5%	+80%	+80%	0		+90%	-15%	+40%	-50%	+50%	8
EVENT AND TREND REACTORS (IMPACTS OR "HITS")	4	4	4	0	4	5	5	5	5	5	

T-4 SIZE OF PORTABLE PHONES
T-6 AVAILABILITY OF WIRELESS FREQUENCIES
T-7 SAFETY ASSUMPTIONS
T-9 COST OF PERSONAL PORTABLE COMMUNICATION
T-8 PCS USE

Events on Events
Percentage change (+ or -)

Events on Trends
Percentage change (+ or -)

STRATEGIC ASSUMPTION SURFACING TECHNIQUE (SAST)



1. Police management
2. The City Manager
3. The City Council
4. OBPOA
5. Media (SD)
6. Local cellular providers (SD)
7. Pacific Bell
8. California OES
9. CPCA
10. CPOA
11. PCS developers
12. U.S. Congress (SD)
13. POST
14. FCC (SD)
15. ACLU (SD)

Chart 3 plots the analysis of stakeholders' assumptions related to the central issue on two criteria. The first is the assumption's stakeholder importance to the issue; the second is the degree of certainty that the assumption is correct.

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