BROADBAND INTERACTIVE MULTIMEDIA TELECOMMUNICATIONS: THE IMPACT ON LAW ENFORCEMENT IN THE NEW MILLENNIUM

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This Command College Independent Study Project is a FUTURES study of a particular emerging issue in law enforcement. Its purpose is NOT to predict the future, but rather to project a number of possisble 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 the 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 - INTRODUCTION

As this day passes, just another day in the so-called routine of the delivery of police services, unseen massive forces race towards a cataclysmic convergence of technologies that will fundamentally alter the structure of the world around us and the delivery of those police services.(1) This approaching convergence of technologies will produce a synergy of geometrically increasing power whose impact on society is likened by many to be equal to the introduction of the telephone.(2) The importance of such an eventuality cannot be overstated. The last time society saw such broad change occur was when the telephone inaugurated the age of analog telecommunications: telephone, radio, television. The use of these technologies in American society has profoundly affected the way its members interact, where and how they work and play, and their values. These same technologies form the basic telecommunications infrastructure that supports most of American government, and policing in particular.

At the dawn of the telephone age, while no one was prepared for or envisioned the subsequent evolution of technology and associated social impacts that such a discovery would spawn, there was no traumatic upheaval or disruption of society. One major factor was the pace of that evolution. Many years often elapsed before the next major stride forward. This relatively slow pace allowed much of the disruption in old established systems to be mitigated. It allowed professionals and lay people alike to keep pace with and understand the innovations that the technology empowered. It allowed each new generation passing through the educational systems to be brought up to speed.(3)

The revolution in telecommunications infrastructure that faces society in the next decade does not provide any such luxuries. It is no secret to most citizens of our country that the pace at which technology is currently evolving has already reached a rate that most find discomforting.(4) Every astute professional, regardless of discipline, knows he or she is constantly in danger of being outpaced by the technological developments in their own field. These fears are quite real and are validated by the study of past introductions of new technologies.(5) This is particularly true in the telecommunications field. The added problem within the telecommunications arena is that the normal paradigm of technological development and implementation has become invalid. It is still considered very much a rule of thumb that new discoveries make their way from the research and development lab to common usage in about ten years.(6) In the telecommunications area, it is true that many new innovations continue to be introduced. The problem, if it can be labeled so, goes back to those "unseen cataclysmic forces" discussed earlier. There has been a "logjam" that has pent up much of the power of new telecommunications technology. That "logjam" will be breaking apart within the next five to ten years. Just as it is the unconcerned, unknowing resident who is swept to his doom when the proverbial dam breaks, so to are there those who, for the same reasons, are about to fall victim to the bursting of the telecommunications dam. They will be from all fields and professions, but a lot of them, a tragically high percentage of them, may be law enforcement administrators.

Many of the new technologies that make up this pending convergence are familiar to most. Expanding computer power and capacity, fiber optics, digital

television, virtual reality, interactive video, wide and local area networks, video telephones, computer bulletin boards and private subscriber services, intelligent work stations, artificial intelligence, and telecommuting are a few of the concepts and mechanisms that most users of automation technologies have basic familiarity with. They are also some of the more common components of the approaching convergence.(7) The importance of the entire convergence concept is that most of the power of these and other technologies has not been available and will not be available until a particular event occurs. It is for this reason that there is not a very widespread awareness of the potential impact. That particular event is best described by what Vice-President Al Gore has described as the establishment of the nation's "Information Super Highway," more properly identified as a broadband interactive multimedia telecommunications architecture.(8) Identifying and understanding the implications of the existence of such a system strikes at the very heart of the issue this discussion is intended to address. It is this event which will break the "logjam" of technology.

Two years of research and observation as part of a study into the future impacts of this issue have led to the inescapable conclusion that the establishment of the "Information Super Highway" is already in progress and will be substantially completed within the next ten years. In addition to the technologies listed above, nearly 8,000,000 strand-miles of fiber-optic cable have already been laid in this country.(9) Furthermore, this same study has revealed that this fact has generally escaped the attention of law enforcement, and thus there have not been any serious examinations of the specific law enforcement impacts that such a development will

bring. Forecasting procedures reveal that the new telecommunications architecture will change the way many common crimes are now committed. It will create new opportunities for criminality. It will redefine the delivery of police service and fundamentally alter the interface between the community and the police. It will radically alter the world of business and government from the basic organizational structures to the way employees and constituents interact with those organizations.(10) Lastly, it will vastly increase the power of the individual to communicate and access information in any context.

The myopic view of all this, of course, is to assert that what might occur five or ten years from now is not worth worrying about today. This is potentially dangerous, if only from a narrow budgetary viewpoint. Most government agencies use a three- to five-year plan for major capital expenditures; such as computer systems, radio communications upgrades, major optical storage/retrieval systems, et cetera. The technology bought five years from today is being identified now and may well be on desk tops ten years from today. If managers are not at least beginning to think in terms of compatibility with broadband interactive multimedia telecommunications as they currently make these purchasing decisions, not to mention a host of other areas of concern, then they truly will be left in the backwaters of obsolescence.

A very recent but glaring example of this danger is illustrated by the change in cellular phone architecture. In June, 1993, firms in the Los Angeles area will initiate "digital" cellular phone service. This development is a milestone in the evolution towards a personal interface with the "Information Super Highway." It also just as

clearly puts existing "analog" cellular equipment and transmission systems in the same round file as the 4-track automobile stereo. In just this one area, it has now become critical that future investments in cellular be made with an educated eye towards the future world postulated in this study.(11)

The issue of the new telecommunications architecture was explored in the futures research effort documented here and sought to identify key trends and events and their impact on the issue by the year 2003. One of the results of that research was the all-pervasive realization that many law enforcement professionals were not only incapable of exploiting that future potential, but were, in fact, becoming less able to even keep pace with current technology.

The reader will note that the subject of this study is unusually broad. Vigorous review and much discussion with Command College advisors helped develop this issue. In the end analysis, it was the consensus that an attempt should be made to tackle the global perspective. The scanning of the law enforcement community's awareness of this issue was unproductive. An examination of the California Department of Justice's "NCIC 2000" program plan, a major upgrade of that law enforcement data base and network, found not one reference to the "Information Super Highway."(12) Even in government generally, "No one is keeping track of the big data processing/telecommunications picture," according to a 1992 study by Syracuse University, School of Information Studies.(13) For this reason, a broad focus was viewed as appropriate in hopes that by raising widespread awareness, perhaps with several follow-up projects on narrower issues, a significant contribution might be made to the future of law enforcement.

PART I - FUTURES STUDY - DEFINING THE FUTURE

ISSUE IDENTIFICATION

One of the first research tools employed in an effort to identify the issues was the literature scan. From this effort, a Futures File was constructed. The Futures File is a cataloged file of the literature from any possible source that appeared to contain some information regarding trends and events in the world that would impact law enforcement telecommunications. This information was organized into certain categories that would readily allow correlations of similar data and show obvious preponderances in certain areas. The file was set up using the following three sub-files:

I. Activity
   - Trends (Ongoing Patterns)
   - Events (Specific Single Incidents)

II. Area of Greatest Impact - The "STEEP" System
   - Social
   - Technological
   - Economic
   - Environmental
   - Political

III. Scope of Impact
   - Local/State
   - National
   - Global

Over a period of 18 months, the Futures File eventually came to contain over 170 pieces of pertinent published documents and over 100 pieces of unpublished data, primarily private research or presentation notes. Of note was that of over 270 documents, 21 were law enforcement sources, and only one of the law enforcement sources specifically addressed the main issue of this study, and that in a superficial way (approximately 200 words).(14) Also included were six topically related futures studies conducted by prior Command College participants. None of these addressed or even identified the issue of this study.

An even wider review of all obtainable law enforcement literature proved negative. This search also extended to vendors of police automation equipment, none of whom could produce any information on the issue of broadband multimedia telecommunications. A final search for information on this subject was conducted through the SEARCH Group, Inc., in Sacramento. This organization had no files on this subject. This author also attended the SEARCH Group's POST-approved training seminar intended to introduce law enforcement managers and executives to "automation." That also proved negative.

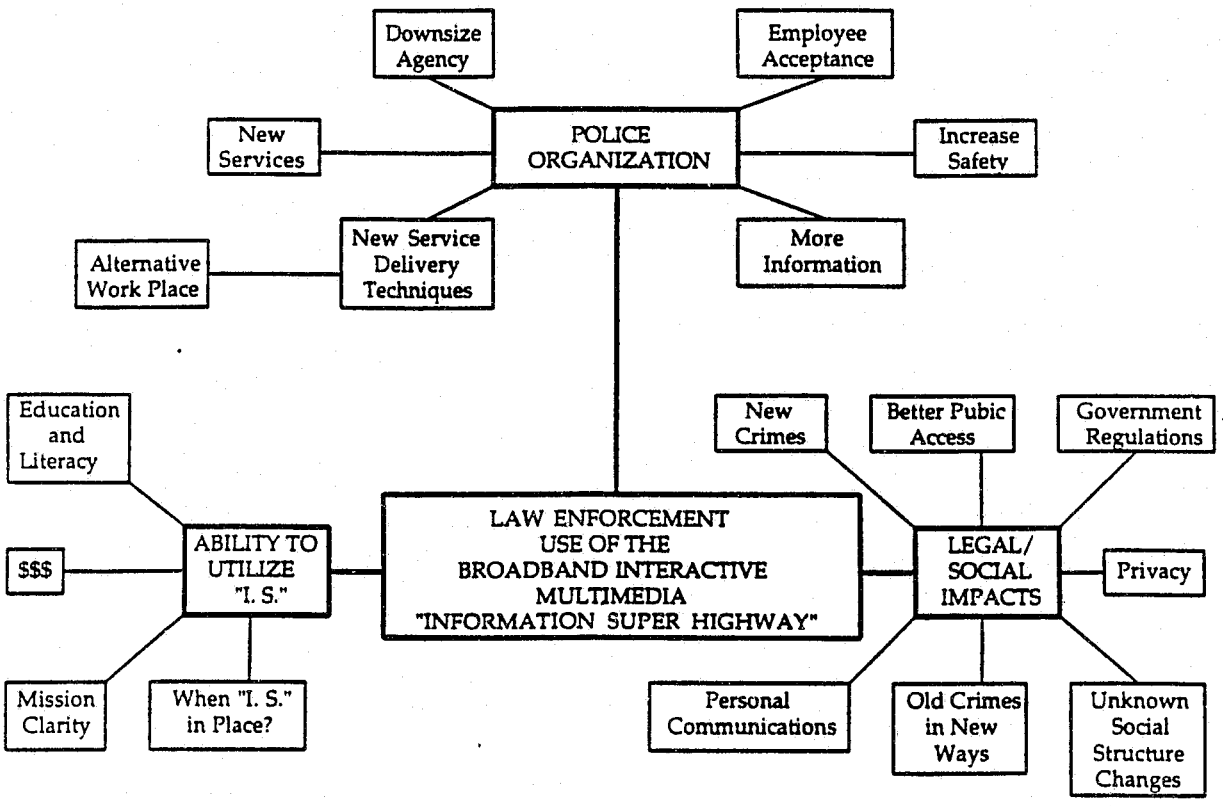
The literature scan itself produced two major areas of focus. First, a lot of sources outside of law enforcement were identifying the approach of the "Information Super Highway."(15) Second, the law enforcement profession appeared equally ignorant of that development. This second area was to be further validated as each additional methodology in this study was applied.

The following illustration depicts an "Impact Network," sometimes also

referred to as a "Futures Wheel," that was constructed to help define the interrelationships and consequences of the issues discussed in this study with the assistance of the "Nominal Group Technique" participants discussed in the next section.

CHART #1

IMPACT NETWORK



ISSUE STATEMENT

What will be the impact of a broadband interactive multimedia telecommunications and information management architecture on law enforcement by the year 2003?

Several "events" have pointed the author in this direction. The first and most poignant was a personal involvement in an automation disaster and the subsequent recovery during which it became painfully obvious that, with few exceptions, law enforcement has an insufficient grasp of where the outer limits of usable technology are, and, even more crucially, where they might be at the end of a five- or ten-year planning process.

The next "event" occurred during research for a Command College intersession exercise on technology that focused on Artificial Intelligence (A.I.) and Expert Systems. As part of the preparation, a grant was obtained ($985) to attend a three-day National Engineering Consortium forum that dealt with the future of A.I. and related telecommunications issues. This event was attended predominantly by private industry research and application professionals on the cutting edge of new telecommunications technology development. There, it was easy to realize that fellow law enforcement managers had little awareness of how far the private sector was pushing out into the future with soon-to-be-implemented telecommunications projects and conceptualizations.

Various presentations at a Command College technology-focused session, as well as related futures file submissions, keep pointing towards greater and greater capacities and potential for data management and applications. Telephone

companies, broadcasters, and cable companies are engaged in fierce battles for control over the nation's data infrastructure in the 21st century.(16) This same infrastructure will be the framework for the law enforcement efforts of the future.

A further consideration of this issue then produces three important sub-issues. These are certainly not the only three potential sub-issues, but are central to any consideration of the main topic.

SUB-ISSUES:

1. What impact will this new architecture have on leadership and hierarchy in law enforcement?

   It has become apparent to this writer through both personal observation and various readings that much of what has been viewed as traditional police management and organizational structure is dictated by the need to manage and control information. As the dynamics of this function change, so must the corresponding structure.

2. What forms of literacy and education will the future systems require from law enforcement personnel?

   It is painfully obvious from my own agency's history and the published comments of fellow students of the Command College that, as a group, the top managers in law enforcement do not have a good grasp of what or how state-of-the-art technology is being applied to current problems. Given this, it is almost impossible to envision these same people being involved in posing new challenges to industry to expand law enforcement capabilities and

effectiveness without some significant form of education beyond what is currently being routinely offered.

3. What are the new legal and social issues that will be faced by law enforcement in the use of this new telecommunications architecture?

   Expanded capability, access, and efficiency in data use not only can better support the law enforcement mission, but also open new doors to the abuse of the data resource from both within and from the outside. There have been many documented cases of information misuse and destruction.

TREND AND EVENT DEVELOPMENT - N.G.T.

Idea generation for the forecasting of technology issues is best handled by an "expert group," as opposed to the singular thoughts of one person. In this context, the "expert group" is not necessarily a group of recognized experts. It is, rather, a panel of experienced professionals from a wide area of disciplines. The particular form used in this study is the "Nominal Group Technique."

This technique for managing expert judgment in a group setting originated with Professors Andre L. Delbecq and Andrew H. Van De Ven at the University of Wisconsin-Madison in the late 1960s and early 1970s. It has a systems engineering rigor that particularly appeals to engineers and is increasing in popularity as a group method, especially in technology companies.

The principal advantage of the nominal group technique is its structure, and its principal disadvantage is also its structure. It is best used when structure is needed, such as in this group when people who do not know each other are brought

together. Other applications include times when people who do not like each other are together, when managers and staff analysts are mixed, when the topic is sensitive or controversial, and when agency politics need to be managed carefully so that the group exercise does not do more harm than good.

The nominal group technique is a somewhat complex format often used to identify new applications for existing technologies. It utilizes the value of both non-confrontational independent evaluation and group consensus to evaluate new concepts.(17)

In this particular case, an additional source of validation was used to evaluate the results of this N.G.T. process. An "unconventional group," or "genius scan" as it is sometimes referred to, was asked to evaluate the issues, sub-issues, and generated trends and events. This was done on a personal, unstructured basis, but still provided valuable information.(18) There was complete consensus with the issues, and a general consensus with the N.G.T. results. The "genius scan" group is identified in the appendix, along with the N.G.T. group. This form of validation was deemed to be very important, given the overall absence of awareness of the issue within law enforcement. The "genius" group developed for this purpose arose from contacts made by the author at five different research forums conducted by the National Engineering Consortium (NEC). The NEC was equally as fascinated with a law enforcement interest in the "Information Super Highway" issue and provided the author grants totalling $4,975 to attend a total of 11 days of research seminars on the issue and related technology.

TREND AND EVENT FORECASTING

The following list of five trends and five events were selected through the N.G.T. process. The criteria applied was: First, how much impact on the issue did the item have? Second, how important was the subject of the item to the future of law enforcement without regard to the issue? Those items that rated high in both areas were weighted the heaviest. The entire list of twenty-nine events and twenty-eight trends generated by the N.G.T. process is contained in the appendix.

SELECTED TREND AND EVENT LISTS
(Rank Ordered, Title Underlined)

EVENTS:

1. Nationwide fiber-optic based multimedia public communications system brought "on line" and accessible to government and the public for two-way communications, media, and data transfer.
2. Major legislation is sponsored to significantly limit the ability of law enforcement to utilize, record, and archive multimedia communications.
3. First interactive multimedia "9-1-1" Call results in a police dispatcher witnessing an assault in progress inside the caller's home and recording same.
4. Police Department in city with full multimedia capability initiates "out of the home" Community Based neighborhood Policing concept wherein officers operate out of their homes with full communications capability.
5. Chief of medium-sized police agency is dismissed by city council for specifying and purchasing a $2 million obsolete communications system that is not multimedia capable.

TRENDS:

1. The ability of law enforcement agencies to effectively implement current state-of-the-art technology in their communications and information management systems.
2. The changes in traditional parameters of "span of control" in police agency hierarchy brought about by the full implementation of multimedia systems.
3. The public's willingness to allow law enforcement expanded access to the networks, data bases, and information systems created in the interactive multimedia environment.
4. The extent to which law enforcement implements telecommuting as an alternative service-delivery mechanism.
5. The ability of citizens to interact with law enforcement through interactive multimedia communications and information systems.

The following data on the selected events will be discussed by individual event. The reader will note that the "turbulent world" occurrence probability of 30% has been applied to these events. This designation describes a state of chaos or instability that is so wild that often a preponderance of evidence has no time to accumulate before the event takes place. This author's perspective of the technological world has changed dramatically in the last year. The disparities are now so great between "what is" and "what can be" that the scales are tipped very precariously with the addition of the "what should be" component.

The Event Evaluation Chart on the following page reflects an overall feeling that law enforcement is already behind the times. The near-term future (5 years) is somewhat stable as various technological events loom up in the long-term future (10 years). The reader will note that on the event graphs depicted in latter pages that in four out of five the time of occurrence, even at 30%, falls into the second five years of the forecast.

The following Trend Evaluation Chart reflects a mixed bag of trends that have declined or risen in the past. There is somewhat less "chaos" in the near-term forecast, but the overwhelming observation is that all of these trends are evolving to a substantially lower level than is desirable. This overall result again reflects back on the original issue and the need to investigate it.

EVENT EVALUATION

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)
1	Fiberoptic Multimedia Nationwide System Turned "On"	5	20	80	10	-0-
2	Legislation Sponsored to Limit Multi-media Record Keeping by Government	3	10	30	2	8
3	First Interactive 9-1-1 Call Results in Dispatcher Witnessing Assault	7	-0-	50	10	1
4	Chief Fired for Spending $2 Million on Obsolete Data/Com System	-0-	50	50	2	6
5	Police Department Initiates "Out of the Home" CBP	5	20	70	6	3

* Panel Medians

TREND EVALUATION

Trend #	TREND STATEMENT (Abbreviated)	LEVEL OF THE TREND ** (Today = 100)			
		5 Years Ago	Today	* Five Years From Now	* Ten years From Now
1	Ability of Law Enforcement to Implement State-of-the-Art Technology	130	100	85 / 170	70 / 180
2	Multimedia Impact on Change from Traditional Parameters of "Span and Control"	90	100	120 / 150	140 / 175
3	Public Willingness to Allow Law Enforcement Expanded Data Access	105	100	90 / 150	100 / 170
4	Telecommuting of Police Work Force	80	100	110 / 130	120 / 155
5	Citizen Interaction with Law Enforcement thru Interactive Multimedia	90	100	115 / 140	145 / 170

** Panel Medians

* Five Years From Now: "will be" / "should be"

* Ten Years From Now: "will be" / "should be"

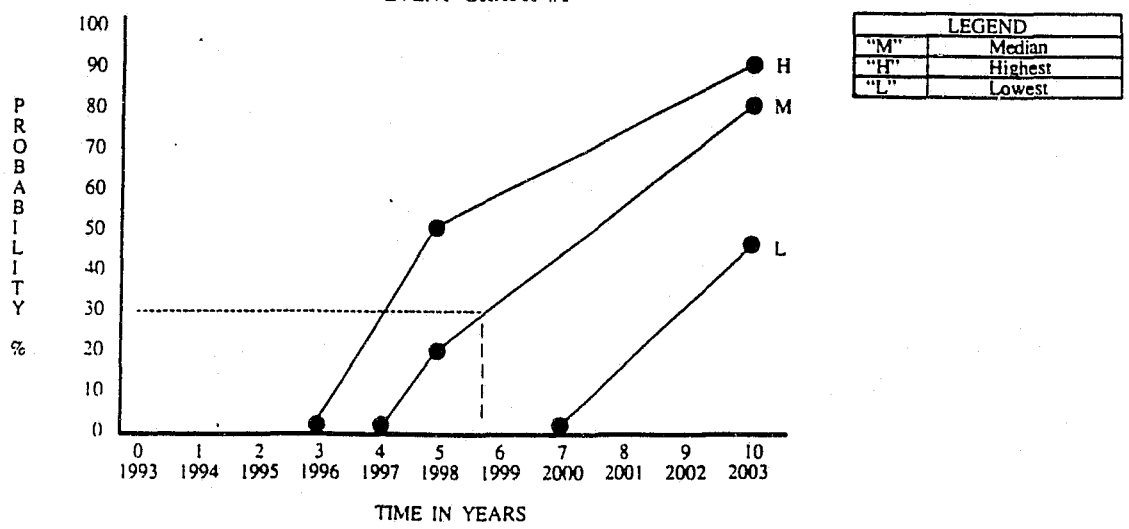
EVENT #1: Fiber Optics Nationwide System Turned On

This event graph shows a high expectation of this event in the distant future. The lower range reflects a much more skeptical minority opinion as to when the event might probably occur.

The event itself is a key occurrence. While this is not the point to discuss cross impacts, it was apparent to all concerned that this single event would be a major driver of change of all sorts, and it seemed that at least some form of "cross impact" impact was generated by the discussion of this event and reflected in the discussions of other events.

This event is the keystone event for the issue. From the standpoint of communications, the establishment of a fiber-optic or any other "broadband capable" form of network, even in just the centers of population and government in the Southern California area, would equate in magnitude to the discovery of wireless communication, of which radio and television are but two manifestations.

EVENT GRAPH #1

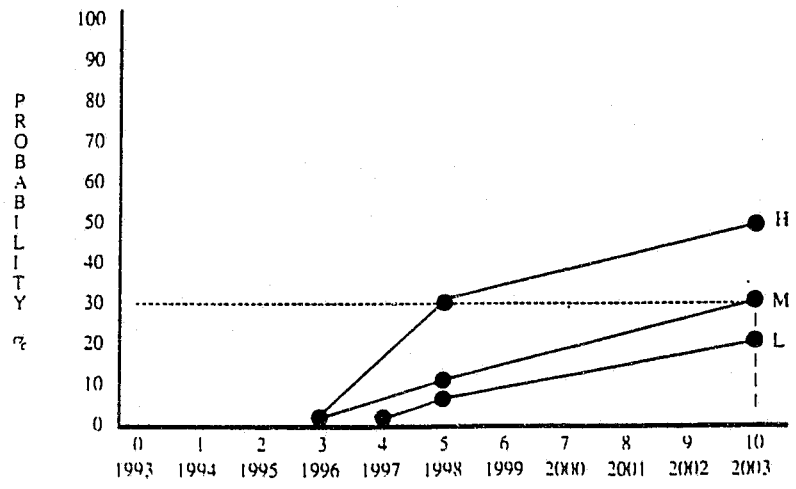


"TURBULENT WORLD" OCCURRENCE LEVEL: 30% (DOTTED LINE)

EVENT #2: Legislation Sponsored to Limit Multimedia Record Keeping by Government

There was general consensus of the forecasting of this event. The occurrence (in the "Turbulent World") comes quite late in the forecast because the impact created by this activity is really minimal until there is something to take away! It must be stressed that this is the sponsoring of legislation, not the implementation of enacted law. This translates into a feeling that going too far with cutting-edge technology and its related costs may set one up for disaster if expenditures later cannot be utilized as intended, another justification for utilizing valid forecasting, policy analysis, and planning mechanisms in the conduct of government.

EVENT GRAPH #2



LEGEND	
"M"	Median
"H"	Highest
"L"	Lowest

"TURBULENT WORLD" OCCURRENCE LEVEL: 30% (DOTTED LINE)

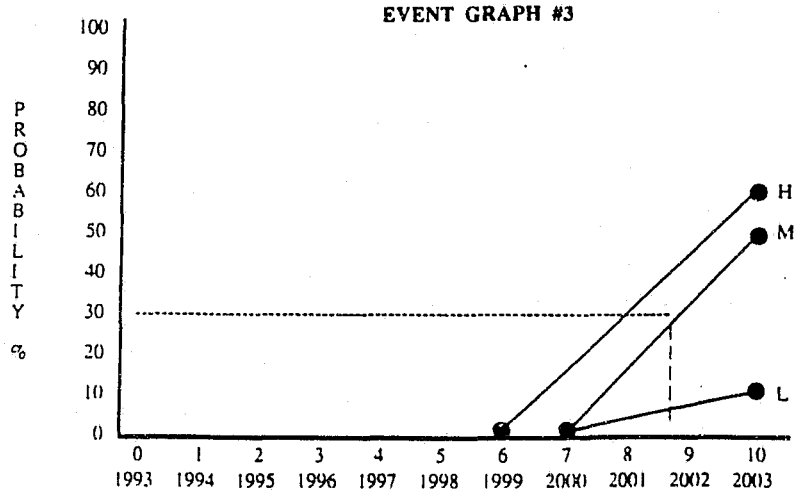
EVENT #3: First Interactive 9-1-1 Call Results in Dispatcher Witnessing an Assault

This event generated consensus on timing, but not on probability, in the minority view, as indicated by the lower range. There were members of the group who just could not visualize this event taking place (a subtle reminder of the major issue). It appeared that, to them, this was just too radical an event to conceive of in their professional context.

In the majority view this was an event that many of the N.G.T. Group wanted to happen. There would appear to be an inherent danger with events like this in the N.G.T. process. A postulated event might be so enticing, so desirable, that objective analysis of how probable the occurrence is can be skewed. The group had to be specifically briefed on this bias, and it is believed that an accurate forecast was achieved.

This event, while a significant evolution of 9-1-1 capability in and of itself, is also a representative example of a myriad of similar types of developments that would simultaneously arise. It is also a triggering event for apprehensiveness about the "Orwellian" intrusiveness of such technology.

EVENT GRAPH #3



LEGEND	
"M"	Median
"H"	Highest
"L"	Lowest

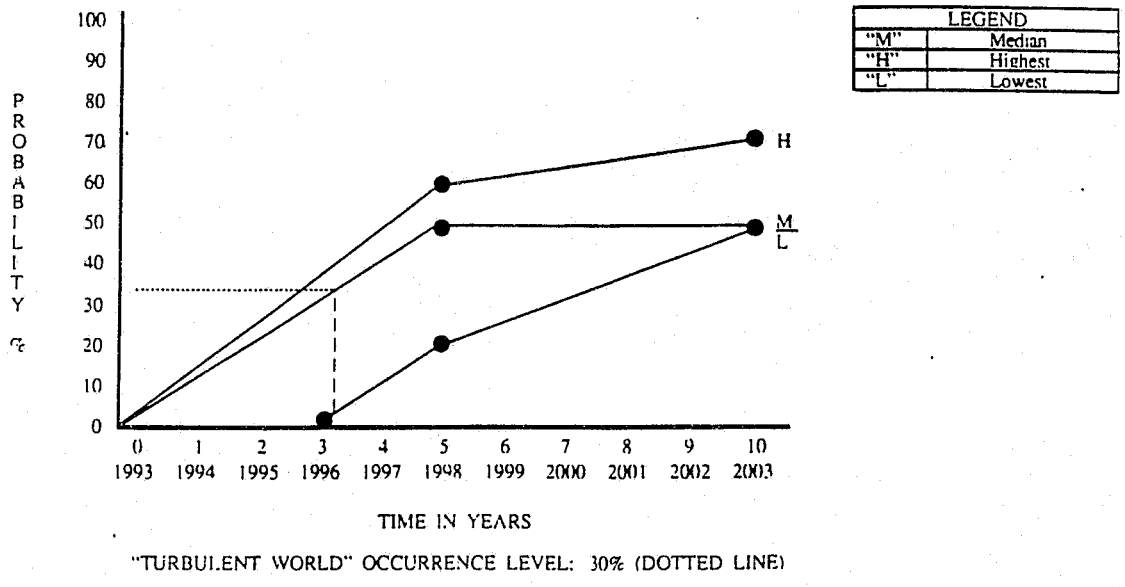
"TURBULENT WORLD" OCCURRENCE LEVEL: 30% (DOTTED LINE)

EVENT #4: Police Department Initiates "Out of the Home" Community Based Policing (CBP)

This event showed relative consensus on timing and probability. This is one of the types of things that was referred to in the Event #2 discussion. That is, it is representative of a whole spectrum of events that could be expected once a certain technology threshold is reached.

The event refers to the potential of literally blending some telecommuting and CBP issues together.

EVENT GRAPH #4



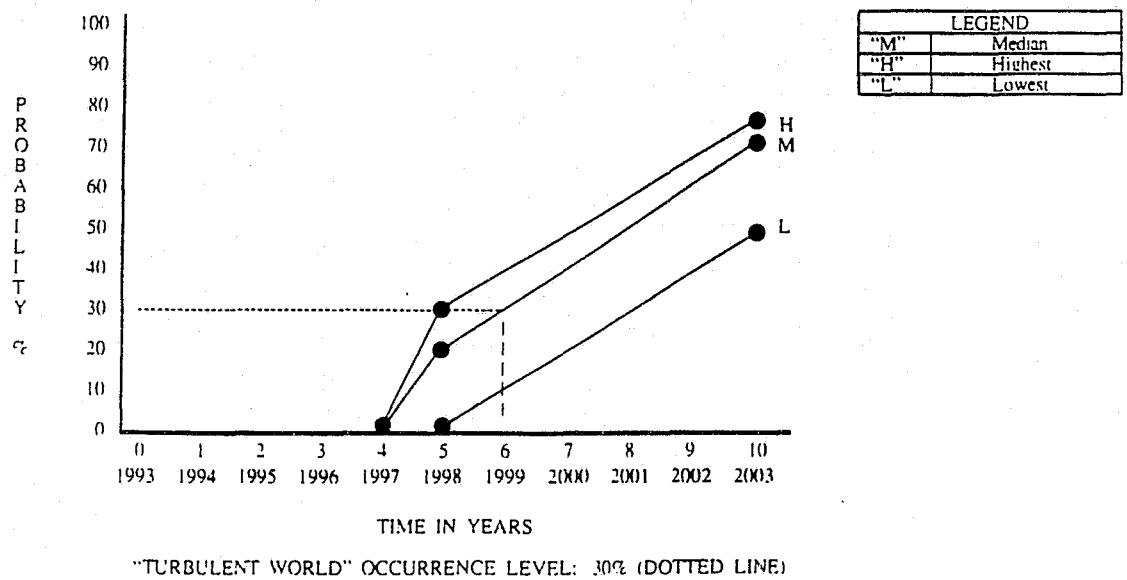
"TURBULENT WORLD" OCCURRENCE LEVEL: 30% (DOTTED LINE)

EVENT #5: Chief Fired for Spending $2 Million on Obsolete Data/ Communications Systems

The graph represents the only event out of the five that is believed to occur in the short term. This would appear to lend credence to the study's hypothesis that there is a problem in this area and a need to address the root causes. It is significant that all responses indicated that there was a high probability that this would happen sooner or later. Interestingly, the group felt that this kind of mistake would be so apparent as the technology appeared that it would be easily avoided in the later years.

The event itself is indicative of a growing depth of critical review in a world where technology is improving as dramatically as revenues are declining. With funds becoming less available, it is even more imperative that when money is spent, it is spent for the greatest level of functionality over time for the dollars invested.

EVENT GRAPH #5

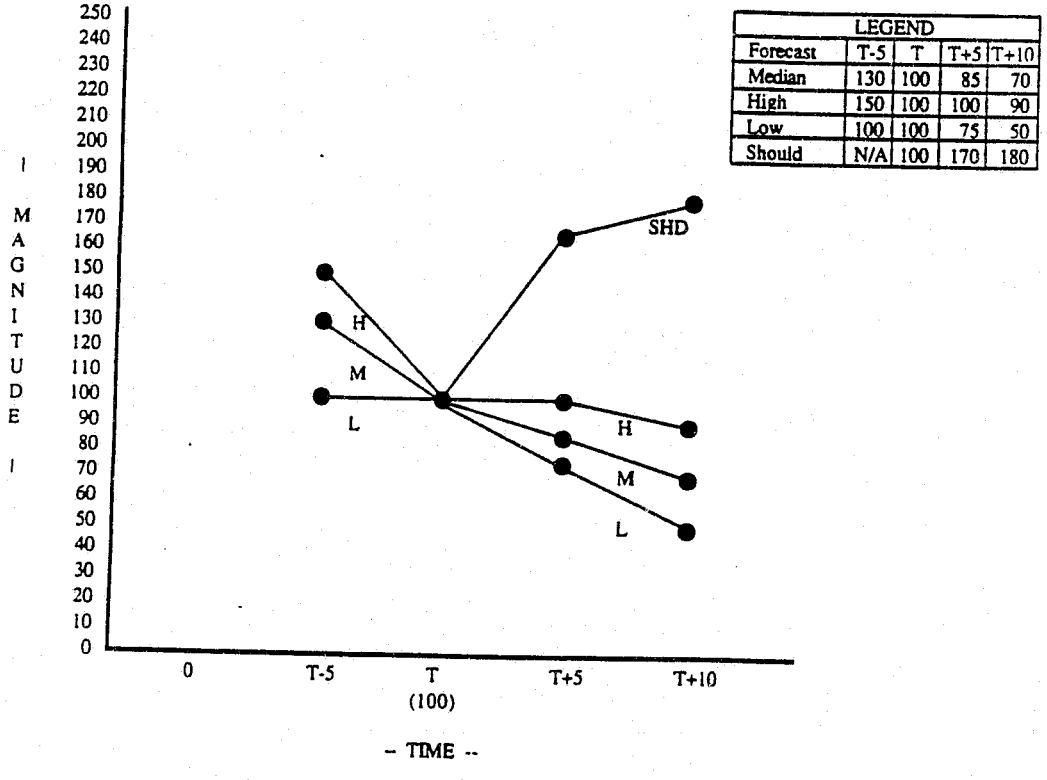


"TURBULENT WORLD" OCCURRENCE LEVEL: 30% (DOTTED LINE)

TREND #1: Ability of Law Enforcement to Implement State-of-the-Art Technology

This trend is quite clear. Law enforcement's ability to make use of the new technologies is declining about as rapidly as new developments are appearing. There is strong consensus on the need to significantly alter this state of affairs in a major way. This is the strongest candidate of all the trends for massive policy intervention in the early years.

TREND GRAPH #1

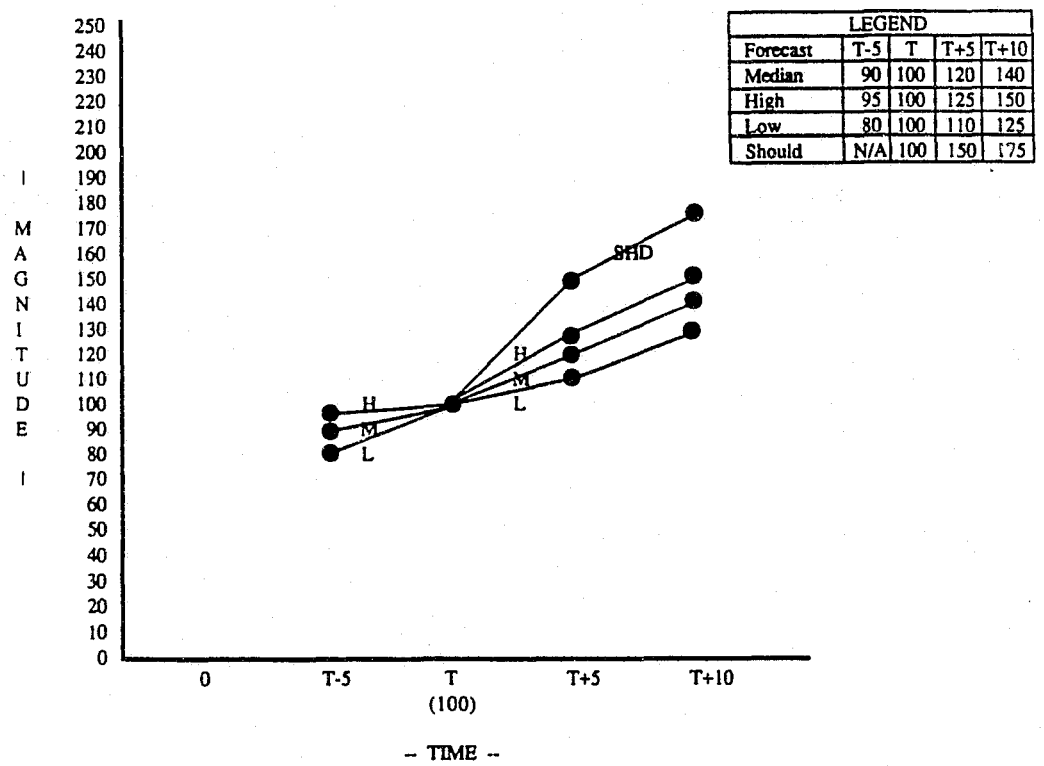


LEGEND				
Forecast	T-5	T	T+5	T+10
Median	130	100	85	70
High	150	100	100	90
Low	100	100	75	50
Should	N/A	100	170	180

TREND #2: Multimedia Impact or Change from Traditional Parameters of "Span and Control"

This graph is interesting in that it shows an exciting trend that, while not up to desired levels, is at least proceeding in the right direction. This trend statement referred to the ability to alter the ratio of supervisors, managers, and subordinates through the power of the new communications technology. This was uniformly interpreted by participants to mean that more subordinates could be effectively managed by fewer superiors with associated cost savings.

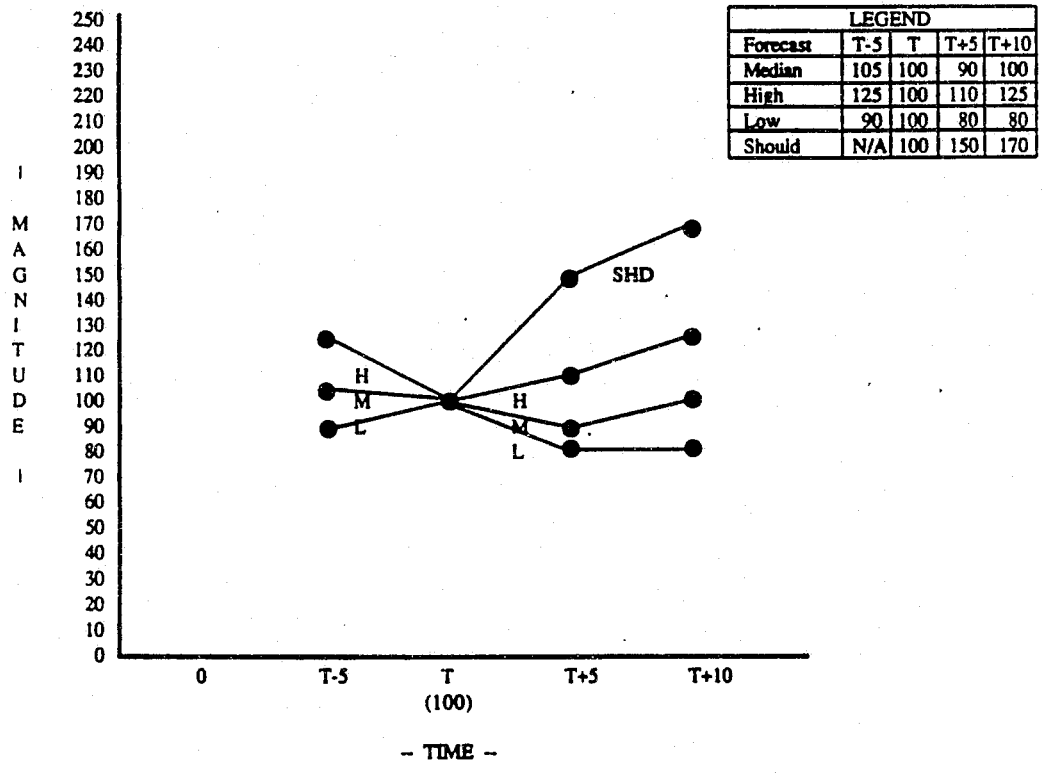
TREND GRAPH #2



TREND #3: Public Willingness to Allow Law Enforcement Expanded Data Access

This is an interesting trend in that it would appear that past and current reluctance to allow access will continue in the short term, only to reverse itself once the public is exposed to the full impact of this technology in the long term. It is interesting to note that the group contained law enforcement and technical professionals, the first group biased towards maximum enforcement use of any information and the other biased towards taking advantage of all the power that any technology can provide, a strong argument for focussing on the median. Inclusion of other special interest groups might have made significant difference in this outcome and represent a factor that should be addressed in a "real world" application of this process.

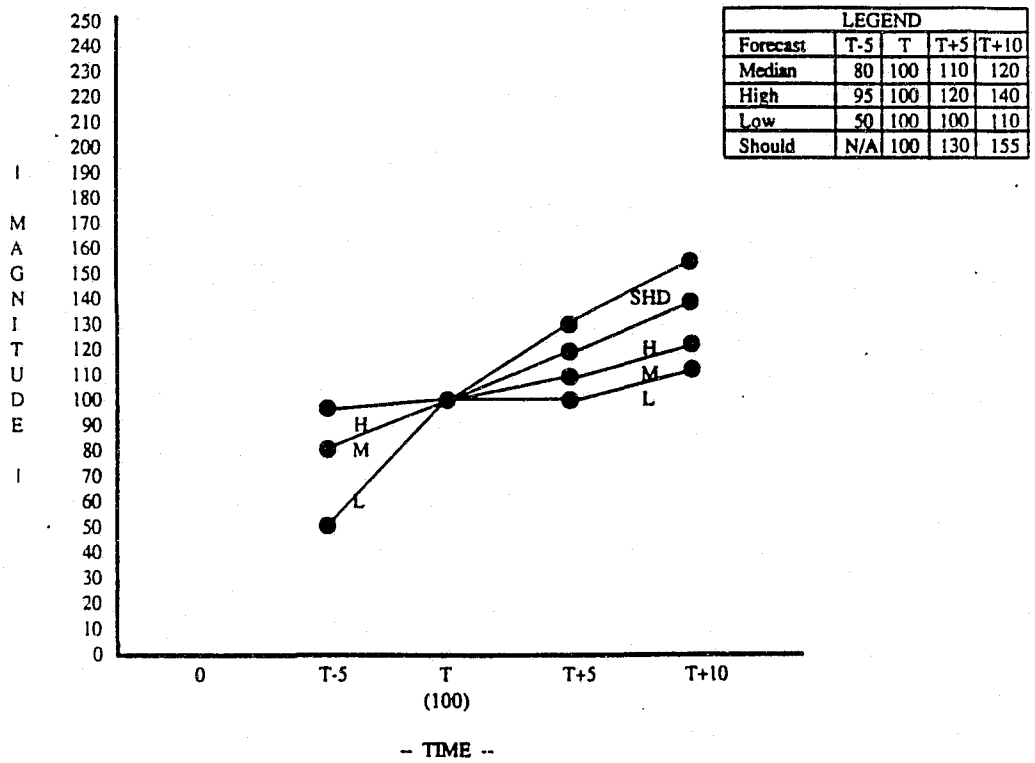
TREND GRAPH #3



TREND #4: Telecommuting of the Police Work Force

This graph represents a trend that is impacted more by many other unrelated pressures than by the application of new technology. Budget restrictions, pollution and traffic congestion remediation, and work force demands for flexible and reduced work weeks all force this issue. The new technology discussed here actually is the tool by which these demands can be accommodated. While the event dealing with the residence-based community based policing concept is a spinoff of this trend, it is not a driving force that would force telecommuting without these other pressures being present. This would appear to explain why this graph is the least radical of the series.

TREND GRAPH #4

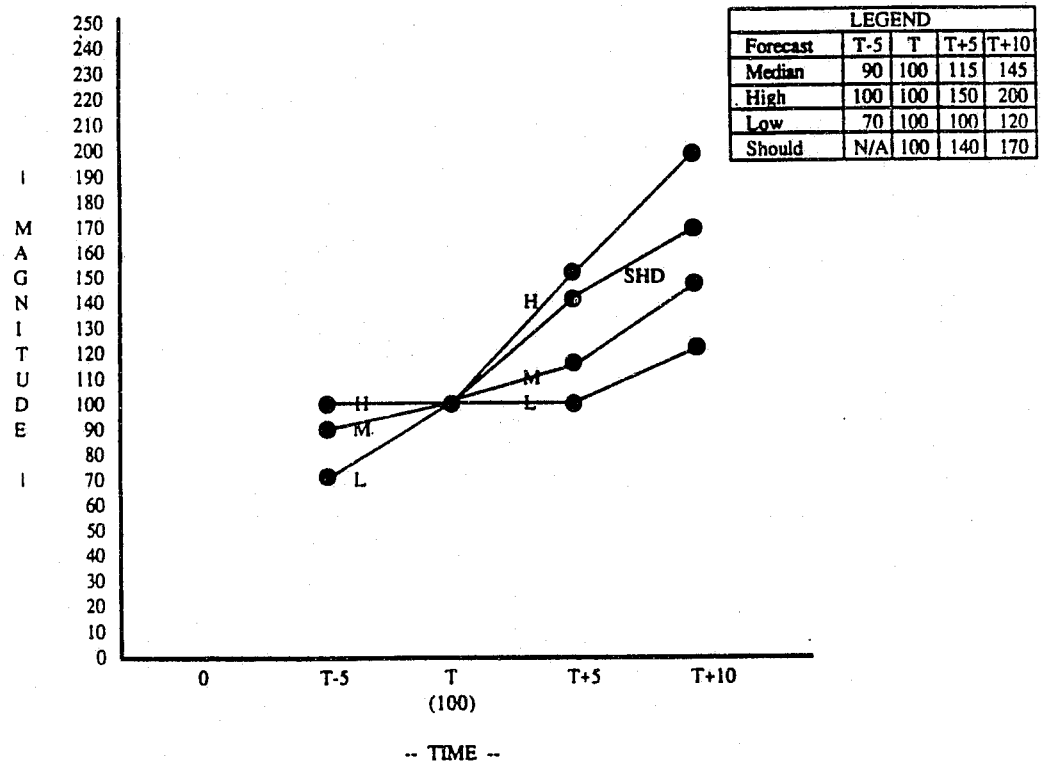


LEGEND				
Forecast	T-5	T	T+5	T+10
Median	80	100	110	120
High	95	100	120	140
Low	50	100	100	110
Should	N/A	100	130	155

TREND #5: Citizen Interaction with Law Enforcement through Interactive Media

This trend was seen very divergently by the group. While consensus was achieved regarding the perception of increased citizen interaction, the spectrum of that interaction was very wide and the most radical of the trend series. One problem in dealing with this trend was the difficulty of visualizing the specific details of events creating such a trend and how they would impact the law enforcement mission. This represents another return to the central issue: that is, the inability to look at a new leading edge of technology and relate it to the law enforcement mission by conceptualizing new and different ways of doing current task. In other words, one needs to dream and fantasize a bit within some wide parameters about what could be. Obviously, some on the group were more adept at this than others, resulting in the significant spreads between the forecasted trend levels.

TREND GRAPH #5



CROSS-IMPACT ANALYSIS

Cross-impact analysis is a modeling technique for depicting how the occurrence or non-occurrence of each event in the previously forecasted events affects (1) the subsequent probability of occurrence of each of the other events in the set and (2) the subsequent level of each trend in the set of previously forecasted trends. The purpose of this technique is to generate the chronological listing of one or more alternatives to the "most likely" or "expected value" future, sometimes referred to as the "hypothetical" future, and to analyze the consequences of implementing specific policies, often referred to as the "normative" future.

This analysis utilizes a matrix format for both the actual impact evaluations and to then illustrate, in a simple way, these impacts so that they can then be used to generate alternative futures. The matrix impacts have been translated into graphic displays for each trend and event. Each graph shows how an impacted event or trend is altered by these specific events that the matrix has determined to have impact. These graphs then become actual forecasts of the events and trends as influenced by each other and the defined "world" they occur within. For the purposes of this study, an occurrence level of 30% was selected. This level is synonymous with a "turbulent world" view, where change is occurring quickly and chaotically. This is particularly appropriate for technology forecasting.

In constructing these forecasts, mere accuracy is not the sole, or even major, emphasis. The value of the forecast is found less in its use as a tool for strategic planning, and more in its use as a tool for strategic thinking. Certainly accuracy is not to be sacrificed, but even an inaccurate forecast can be of great value by forcing

strategic thought about the issue and its impacting trends and events. That strategic thought is most typified by the scenarios which follow the forecasts. The following cross-impact analysis was performed by the author with after-the-fact concurrence by some members of the N.G.T. Group.

EVENT-T0-EVENT CROSS-IMPACT MATRIX

IMPACTING EVENT		MAXIMUM IMPACT & YEARS TO MAXIMUM				
		4	1	5	3	2
E4	CHIEF FIRED	X		+10 2.0	+10 1.0	
E1	F/O M/M "ON"	+20 1.0	X	+50 2.0	+70 3.0	+20 3.0
E5	PD "HOME CBP"	+20 1.0	+5 2.0	X		+40 1.0
E3	9-1-1 CALL	+50 0.5	+5 2.0	+20 1.0	X	-10 0.5
E2	LEGIS		-5 1.0	-20 0.5		X

BASIC CROSS-IMPACT EVALUATION MATRIX

PRE-POLICY

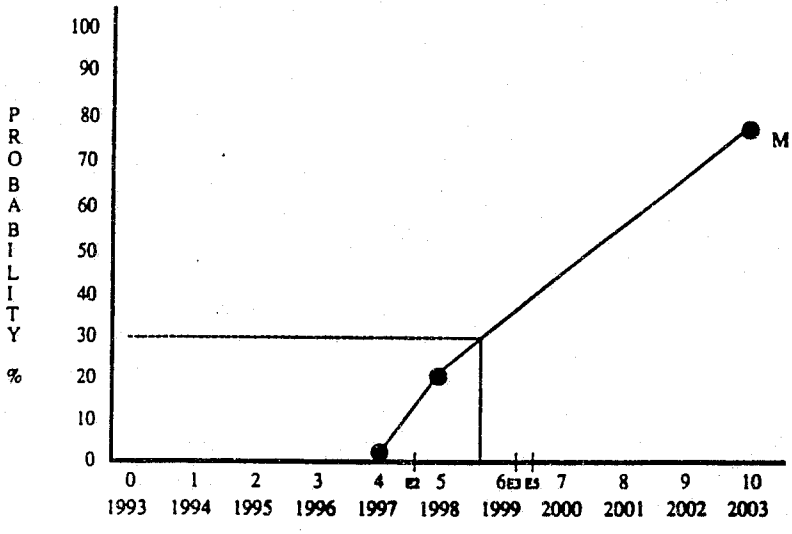
IMPACTING EVENT		IMPACTED EVENTS					IMPACTED TRENDS *				
		E4	E1	E5	E3	E2	T1	T2	T3	T4	T5
E4	CHIEF FIRED	X	—	+10 2.0	+10 1.0	—	+20 3.0	—	—	+10 1.0	+10 1.0
E1	F/O M/M "ON"	+20 1.0	X	+50 2.0	+70 3.0	+20 3.0	+50 0.5	+30 4.0	-10 0.5	+70 2.0	+90 5.0
E5	PD "HOME CBP"	+20 1.0	+5 2.0	X	—	+40 1.0	—	+40 0.5	-10 0.5	+75 1.0	+50 2.0
E3	9-1-1 CALL	+50 0.5	+5 2.0	+20 1.0	X	-10 0.5	—	—	+5 0.5	—	+30 1.0
E2	LEGIS	—	-5 1.0	-20 0.5	—	X	-10 0.5	—	-15 1.0	-10 3.0	-5 0.5

* Impact on trend reflects percentage change in listed magnitude rating. Example: "+20/3.0" for T1 equates to a 20% increase 3 years later in a magnitude of 75 at T+7, which equals a magnitude of 90 as reflected on Trend Graph 1.

CONSEQUENCES OF E-E IMPACTS IN "TURBULENT" WORLD (30%)

EVENTS IN ORIGINAL ORDER OF OCCURRENCE	ORIGINAL DATE OF OCCURRENCE	DATE AFTER CROSS-IMPACTS OF THESE EVENTS				
		E4	E5	E2	E1	E3
E4 CHIEF FIRED	FEBRUARY 1996	X	–	–	–	–
E1 F/O M/M "ON"	SEPTEMBER 1998	–	–	–	X	–
E5 PD "HOME CBP"	JANUARY 1999	FEB '98	X	–	–	–
E3 9-1-1 CALL	SEPTEMBER 2001	–	–	–	JAN '99	X
E2 LEGIS	JANUARY 2003	–	AUG '98	X	–	DEC '99

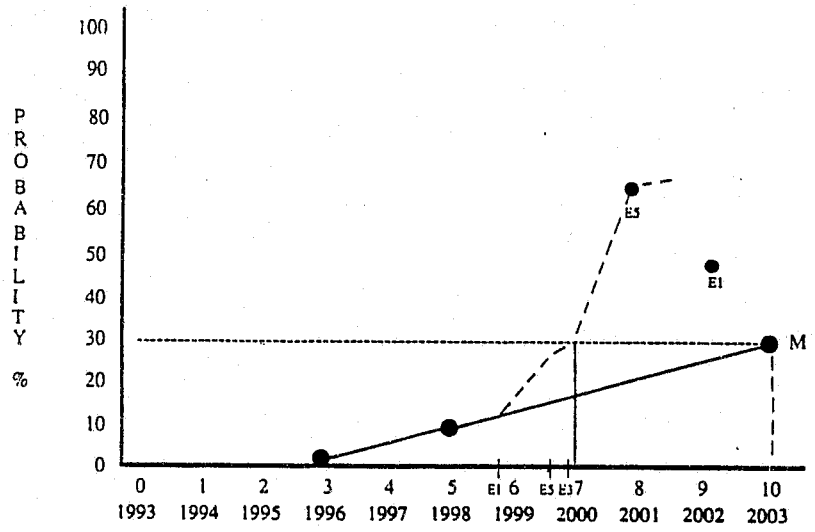
EVENT GRAPH #1



LEGEND		
Event	Date of Occurrence	Date of Max. Impact
E4	Feb. 1996	None
E2	Aug. 1998	None
E5	June 1999	None
E3	Aug. 1999	None
Master Event Occurrence		
Original Date		Revised Date
September 1998		September 1998

"TURBULENT WORLD" OCCURRENCE LEVEL: 30% (DOTTED LINE)

EVENT GRAPH #2

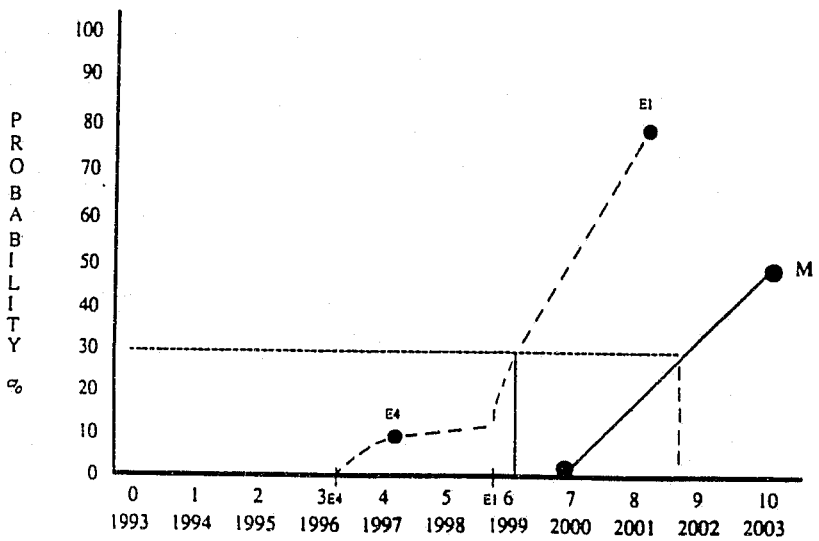


TIME IN YEARS

"TURBULENT WORLD" OCCURRENCE LEVEL: 30% (DOTTED LINE)

LEGEND		
Event	Date of Occurrence	Date of Max. Impact
E4	Feb. 1996	None
E1	Sept. 1998	Jan. 2002
E5	June 1999	June 2000
E3	Aug. 1999	None
Master Event Occurrence		
Original Date		Revised Date
January 2003		December 1999

EVENT GRAPH #3

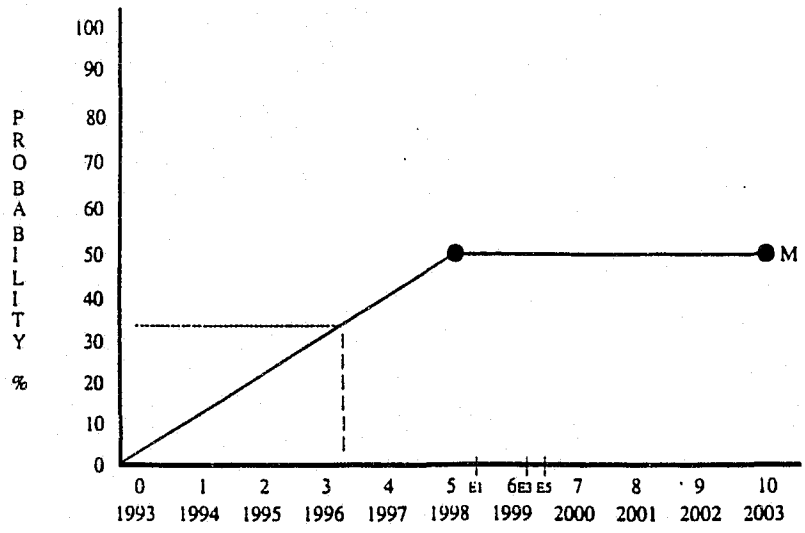


TIME IN YEARS

"TURBULENT WORLD" OCCURRENCE LEVEL: 30% (DOTTED LINE)

LEGEND		
Event	Date of Occurrence	Date of Max. Impact
E4	Feb. 1996	Feb. 1997
E2	Aug. 1998	None
E1	Jan. 1999	Jan. 2001
E5	June 1999	None
Master Event Occurrence		
Original Date		Revised Date
September 2001		January 1999

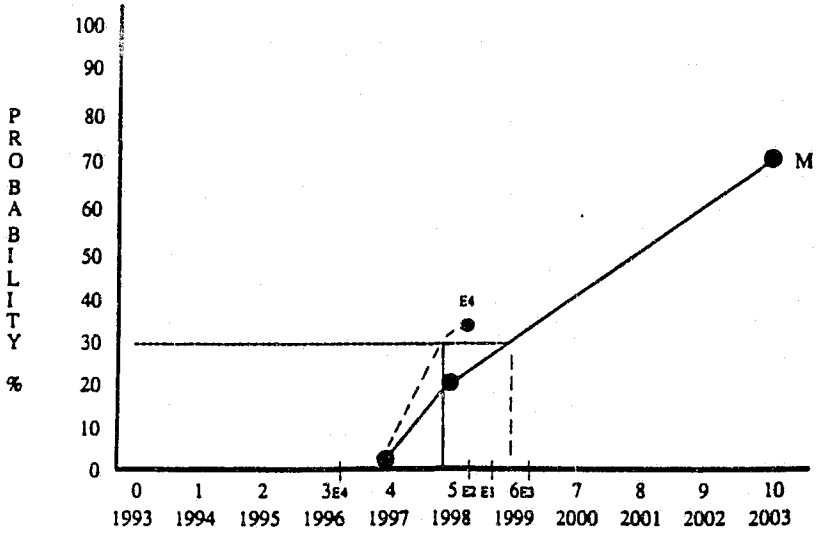
EVENT GRAPH #4



LEGEND		
Event	Date of Occurrence	Date of Max. Impact
E2	Aug. 1998	None
E1	Sept. 1998	None
E5	June 1999	None
E3	Jan. 1999	None
Master Event Occurrence		
Original Date		Revised Date
February 1996		February 1996

"TURBULENT WORLD" OCCURRENCE LEVEL: 30% (DOTTED LINE)

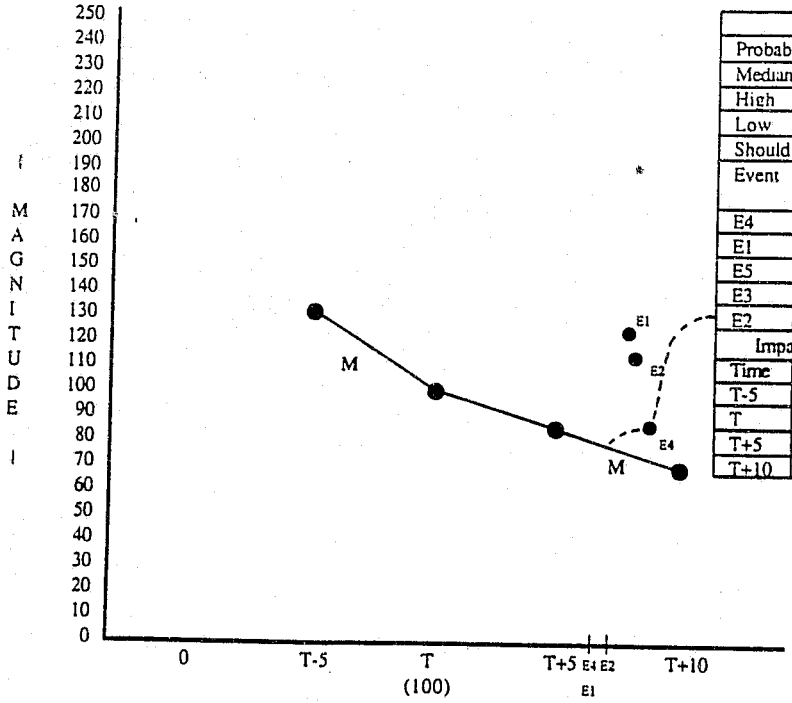
EVENT GRAPH #5



LEGEND		
Event	Date of Occurrence	Date of Max. Impact
E4	Feb. 1996	Feb. 1998
E2	Aug. 1998	None
E1	Jan. 1999	None
E3	Aug. 1999	None
Master Event Occurrence		
Original Date		Revised Date
January 1999		February 1998

"TURBULENT WORLD" OCCURRENCE LEVEL: 30% (DOTTED LINE)

TREND GRAPH #1

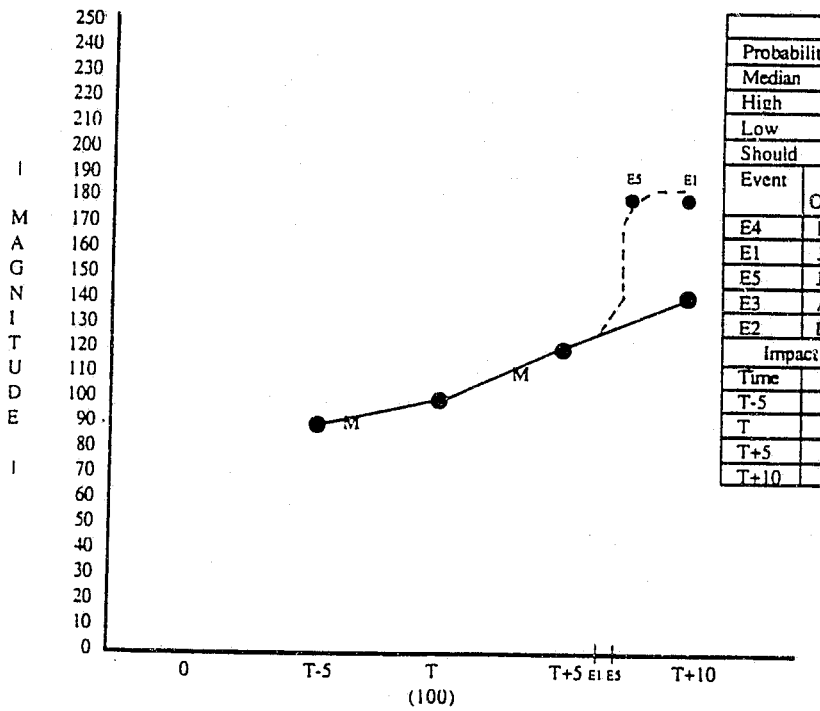


LEGEND				
Probability	T-5	T	T+5	T+10
Median	130	100	85	70
High	150	100	100	90
Low	100	100	75	50
Should	N/A	100	170	180

Event	Date of Occurrence	Date of Max. Impact
E4	Feb. 1996	Feb. 1999
E1	Jan. 1999	July 1999
E5	June 1999	None
E3	Aug. 1999	None
E2	Dec. 1999	June 2000

Impact on Median Magnitude		
Time	Original	Revised
T-5	130	—
T	100	—
T+5	85	85
T+10	70	135

TREND GRAPH #2

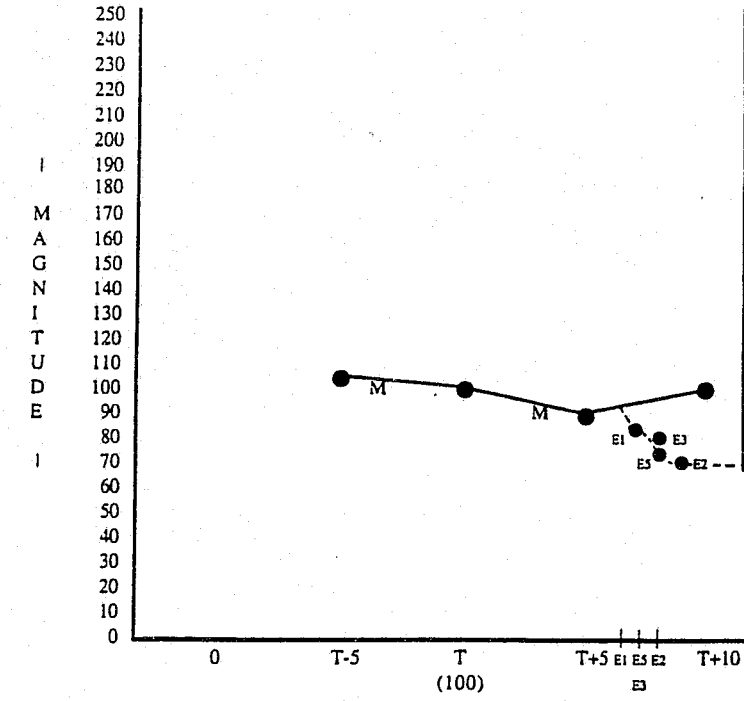


LEGEND				
Probability	T-5	T	T+5	T+10
Median	90	100	120	140
High	95	100	125	150
Low	80	100	110	125
Should	N/A	100	150	175

Event	Date of Occurrence	Date of Max. Impact
E4	Feb. 1996	None
E1	Jan. 1999	Jan. 2003
E5	June 1999	Dec. 1999
E3	Aug. 1999	None
E2	Dec. 1999	None

Impact on Median Magnitude		
Time	Original	Revised
T-5	90	—
T	100	—
T+5	120	120
T+10	140	182

TREND GRAPH #3

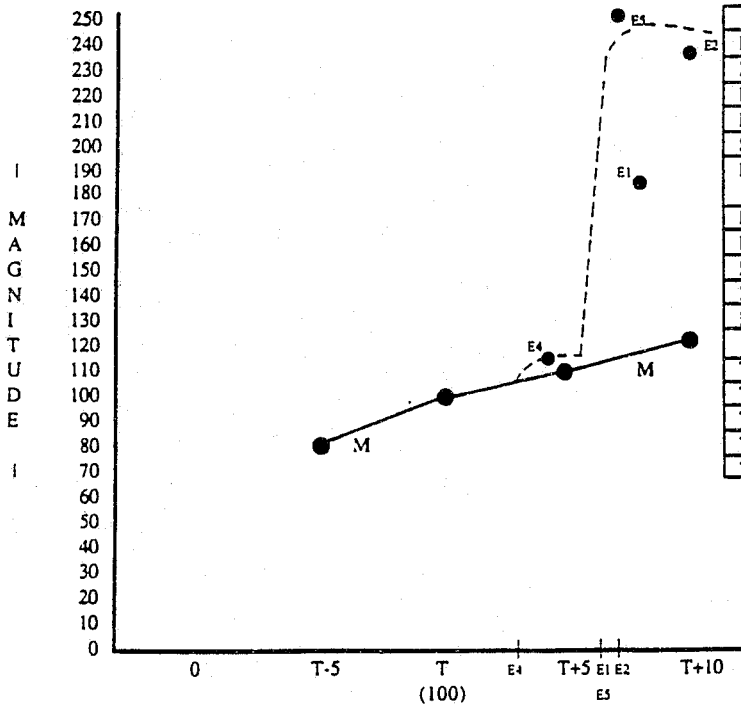


LEGEND				
Probability	T-5	T	T+5	T+10
Median	105	100	90	100
High	125	100	110	125
Low	90	100	80	80
Should	N/A	100	150	170

Event	Date of Occurrence	Date of Max. Impact
E4	Feb. 1996	None
E1	Jan. 1999	July 1999
E5	June 1999	Dec. 1999
E3	Aug. 1999	Jan. 2000
E2	Dec. 1999	Dec. 2000

Impact on Median Magnitude		
Time	Original	Revised
T-5	105	—
T	100	—
T+5	90	90
T+10	100	73

TREND GRAPH #4

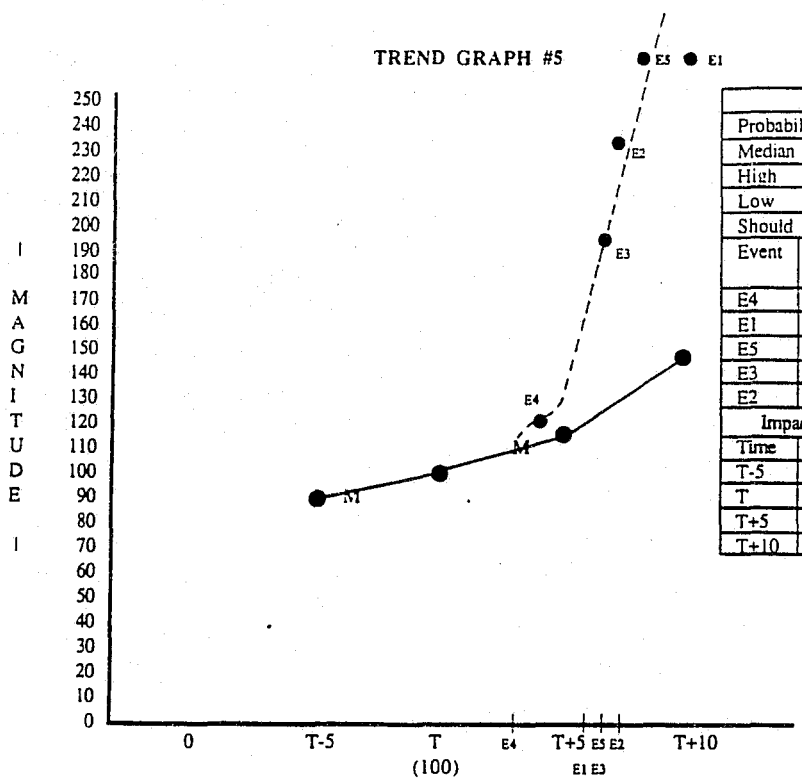


LEGEND				
Probability	T-5	T	T+5	T+10
Median	80	100	110	120
High	95	100	120	140
Low	50	100	100	110
Should	N/A	100	130	155

Event	Date of Occurrence	Date of Max. Impact
E4	Feb. 1996	Feb. 1997
E1	Jan. 1999	Jan. 2001
E5	June 1999	June 2000
E3	Aug. 1999	None
E2	Dec. 1999	Dec. 2002

Impact on Median Magnitude		
Time	Original	Revised
T-5	80	—
T	100	—
T+5	110	114
T+10	120	245

TREND GRAPH #5



LEGEND				
Probability	T-5	T	T+5	T+10
Median	90	100	115	145
High	100	100	150	200
Low	70	100	100	120
Should	N/A	100	140	170

Event	Date of Occurrence	Date of Max. Impact
E4	Feb. 1996	Feb. 1997
E1	Jan. 1999	Jan. 2004
E5	June 1999	June 2001
E3	Aug. 1999	Aug. 2000
E2	Dec. 1999	June 2000

Impact on Median Magnitude		
Time	Original	Revised
T-5	90	—
T	100	—
T+5	115	125
T+10	145	250+

FUTURES SCENARIOS

The concept of scenarios originated from the theater. They were essentially the playwrighter's outline of a plot for a play. The writer would use the scenario as a planning tool in the script construction. This concept was adopted by the Rand Corporation in the 1950s for use as a tool in constructing strategic plans for the U.S. Air Force to successfully wage war against the Soviet Union.

By the 1960s, the Rand Corporation had developed an approach to scenario generation that employed the cross-impact techniques highlighted in this report. This approach attempts to integrate all the forecasted trends and events into a distribution of scenarios. Each of these scenarios consists of a "non-fictional" narrative -- typically written as if by a historian looking back over the forecasted events and trends as if they had actually occurred -- intended to clarify the causes and consequences of major developments, and thereby facilitate the identification and evaluation of relevant policies or actions by the user.

The three scenarios constructed in this report are descriptions of alternative, but internally consistent, sets of outcomes based on the cross-impact analysis for the purpose of both forecasting and strategy simulation.[18] They are labeled "exploratory," "hypothetical," and "policy" scenarios.

The first scenario, the "exploratory" one, depicts a world where forecasted events did not happen, and no strategy has been formulated to deal with the issue and sub-issues.

The second scenario, the "hypothetical" one, depicts a world where forecasted

events did in fact occur, but, again, without a strategy to deal with the issue and sub-issues.

The third scenario, the "policy" scenario, depicts a world in which the forecast events have occurred, and in which strategic policy development has occurred. This scenario describes a desired and attainable future and is the embodiment of the author's vision of the future law enforcement can have.

This author has also discovered that it is this collection of scenarios that, when first read by a reader unfamiliar with the issue, provides the first glimmer of recognition about the importance of the issue and sub-issues.

FUTURES SCENARIOS

SCENARIO I (EXPLORATORY)

In 1993, the department found itself in trouble. Growth in service delivery had crowded the two radio channels to intolerable and unsafe levels. Over 15% of the department's office space was dedicated to voluminous paper records and file cabinets that required a small army of clerks to service. An aging Computer-Aided Dispatch/Records Management System (CAD/RMS) was still functioning, but after 5 years hardware fatigue and software glitches were starting to occur more frequently.

In August of 1994, a new captain was promoted and, as was always the case, this junior staff officer was assigned the "dirty job." No one wanted to work the Technical Services Division. It wasn't "real police work," and who wanted to deal with "all that computer garbage anyway." The former Division Commander had told him that the best thing to do was just let the vendors design the applications. It was all too complex now anyway. The new captain, a highly successful Detective Bureau Commander, took it all in. He would put in his 2-3 years without stepping on his own toes and get out. He had seen the results of risk-taking. His own promotion was the result of "room at the top" created by the termination of the last chief. That poor devil had tried to do the right thing, but a now-scrapped deal for a CAD/RMS upgrade had cost the chief his job. The city manager discovered that the chief's participation in the Request for Purchase process had resulted in a system design incompatible with existing hardware and software and used obsolete technology.

In January of 1995, Pacific Bell finished installing the basic fiber-optic network for the Los Angeles metropolitan area. New subdivisions were being connected to the fiber network for basic multimedia communication and entertainment service, and the corporate world quickly leaped at the opportunity to access the network for business communication. The new access capabilities were causing discomfort to some, particularly when that capability was being developed by a government agency. The public seemed ambivalent about allowing greater and better access to data bases, with opinion shifting back and forth. The lack of a clear mandate for access, and little or no lobbying by government, had already allowed one of the more radical state assemblymen to sponsor restricting legislation.

In July of 1995, the third phase of the Air Quality Management District (AQMD) master plan was initiated. Among the other mandated pollution and congestion reducing requirements was a 10% telecommuting requirement for all businesses and government entities employing more than 100 persons. The chief wondered what he could do to bring his agency into compliance, or face stiff fines. To keep his service level constant, that meant intensive telecommuting by his administrative and investigative people. Sure, some of his people were "computer nerds" with P.C.'s and modems and "whatever" at home, but most "telecommuters" would just be hauling data home, typing (or scribbling) out a report or memorandum, and hauling it back in two days later. How on earth was he going to make this activity productive? What if they needed more information or to research a file in their office? What if they just loafed around? How could this be managed?

The chief was also increasingly disturbed by the apparent loss of control by his staff. Some of his "computer nerds" often had more and better information on police issues than his captains did.

The lawyer sat at home at his terminal reviewing his next case, the last for 1997. He remarked to himself how fortunate he was to have gotten drawn in the lottery for the few remaining homes in this new tract. The fiber-optic link to his law firm was invaluable now that his wife was home with newborn twins. The fiber link provided full multimedia access to the library, the case files, and teleconferencing with his clerks and partners. "If only that inefficient police department could get beyond the touch-tone phone stage, it might almost be possible to never leave the house accept for court appearances, and who knows, even that might change one day," he mused to himself.

The captain had now spent one year longer in the Technical Services Division than he had hoped. He had planned to have a field command by 1998, but it hadn't worked out and now he was faced with the collapse of the aging CAD/RMS system. Thank god for the sales representative from C.R.P. Company. Not only did the sales representative buy him a lot of lunches, but he had also helped the captain draft a Request for Purchase for the new system. The captain needed to move fast on this project. The neighboring city had just been featured on prime time television regarding their innovative attempt to use the new multimedia communications systems in a new housing subdivision. In a freak case of good luck, one of the first multimedia "9-1-1" calls had actually captured the crime on

live video and caused quite a media stir. Now the pressure from the council was building: "Don't we do that?"

The sales representative remarked to himself that 1999 was a banner year. He had been promoted to sales manager based on the brilliant way he salvaged the year for C.R.P. They had been slow to pick up on the impact of multimedia application systems, and that $2 million sale to the Police Department had cleaned out much of the obsolete inventory. Not only had he taken the captain to lunch, but to the cleaners as well. History was about to repeat itself in the city manager's office.

SCENARIO II (HYPOTHETICAL)

What if each forecasted event realized its maximum negative impact on the issue and the related trends?

In 1993, a Command College project predicting the advent of a revolutionary fiber-optic multimedia communications and data management system received wide circulation but little acceptance. "Flawed data," "pipe dream," and "not in my lifetime" were but a few of the comments the project elicited from law enforcement executives in Southern California. Rather than being viewed as visionary, the report was cited as an example of the Command College being focused on futuristic science fiction instead of real problems facing law enforcement. It came as no surprise then in 1996 when a popular and respected local chief of police lost his job after the purchase of an obsolete and barely functional CAD/RMS communications system. Even though his judgments had been the result of a lack of awareness of what technology was available and how to plan for future needs and interfaces with

other systems, his termination was viewed by many of his peers as consummate proof that you shouldn't stick your neck out over new technology. The episode triggered a general reduction in funding for such projects and a wholesale scramble by police managers and executives to distance themselves from similar projects.

Such retrenchment could not have occurred at a worse time. Fiber optics were continuing to spread across the country like wildfire. As the former chief was packing his bags, the state and federal governments were formulating standards for law enforcement communications and data interfaces that prescribed Fiber-Optic-Based Multimedia (FOMM) technologies. By 1998, large segments of state and federal government were linking up with new FOMM systems. Most of the business world and large segments of newer residential areas were also linking up with FOMM. Increasing business and residential exposure to FOMM began to create new expectations regarding the services provided by local government. Police employees became increasingly aware of their agency's "isolation" from the rest of the world. This was graphically brought to light when the FBI exposed a wide-scale real-time child pornography on demand criminal group using the FOMM technology. Not only was local law enforcement not a progressive user of FOMM, but was also not an informed player in the regulation of criminal uses of FOMM.

Early in 1999, politics, service demands, and community pressures had overcome the reluctance of local law enforcement. Increasing lack of access to FOMM data and communications systems had forced the technological door open once again. Almost overnight, extensive systems were installed. The extensive "catch up" costs had to be offset and justified. One of the "gimmicks" that arose

from this process was a program for residentially based Community Based Policing. Based on the intrinsic ability to have two-way interactive communications and data transfer between any points on the fiber "loop," including virtual conferences, interviews, briefings, et cetera, the need for a centralized police "station" was suddenly questioned. The prospect of cutting numerous and sundry expenses related to maintaining a full headquarters and command staff was irresistible, and an immediate "over-implementation" of the concept took place. Within two years, a major corruption scandal racked the program as the dangers of too little supervision and too great an access to information came to light. It was not long after that major legislation was sponsored to severely restrict law enforcement's access to FOMM data bases.

SCENARIO III (POLICY)

The chief began to straighten up his credenza when he noticed a stack of "Futures File" articles he had gathered in the past year, an old Command College habit that had proved so valuable that it was hard to break. He leafed through the articles back to the first two and recalled the long road that this information had sent him down. The first article, from April 1992, described how Pacific Bell Telephone planned to provide a service to Hollywood Studios to distribute movies to theaters over fiber-optic phone lines. The second, from May of 1992, described the complete and cost-effective conversion of the entire island of Singapore to fiber-optic based multimedia communications by the year 2005. With this and other information, the chief had become convinced that a new historic turning point in

communications and information processing was about to occur. Some R & D types in private industry that he had talked to even described it as equivalent to the invention of the telephone in its potential impact on society.

In August of 1994, a new captain was promoted. It had been a challenging promotional process that had left many other candidates stunned by the "Advanced Technology" component. The new captain eagerly awaited his assignment to Technical Services Division; that was where the action was and he knew the chief would be strongly focused on the division from the way he had pushed computer literacy and information management at the staff meetings, in training sessions, and with his budget priorities. The captain knew there would be support for his ideas on remote work-site deployment with interactive multimedia technology.

In January of 1995, Pacific Bell finished laying the basic fiber-optic network for the L.A. metropolitan area. By prior arrangement, the Bell operating companies had been granted a monopoly to provide the fiber-optic multimedia (FOMM) grid for the state in exchange for the inclusion of state and local government, including law enforcement, into a statewide FOMM grid linking all the various agencies and sites together.

In July of 1995, the third phase of the AQMD master plan was initiated. Among the various requirements was a 10% telecommuting requirement for all major government and business employers.

In January of 1996, the AQMD held an awards banquet and news conference to highlight some of the notable successes in the effort to reduce pollution through restrictions of fossil-fuel-powered commuting. As the chief walked to the podium

to receive his award, he thought how ironic it was. The new FOMM network had provided him with the opportunity to address many issues besides the telecommuting demands of AQMD: the work force demands for flex time and child-care options, the reduction of overhead expenses at headquarters, the reduction in middle-management expenditures, the beginnings of a new experiment into "residence based" Community Based Policing, and a radical new multimedia dispatch/communications system. The chief thought back to just this morning when they had conducted the first staff meeting for managers. Five off-duty managers had teleconferenced from home, one had even presented a "slide" show from his P.C. at home on his proposed management reorganization.

The lawyer sat at home at his terminal reviewing his next case, the last for 1997. The FOMM link to his law firm allowed him complete two-way interaction with his files, including voice, video, images, data, documents, and processing powers above and beyond his P.C.'s capability. He finished his work for the day and then considered what to do about the mountain bike that had been stolen right off the bike rack on his car by a transient in military garb while the citizen was at lunch. He called up the local government services bulletin board on his terminal. Under "Police" he found the listing for self-reporting of non-emergency thefts. The citizen generated a report format and filled in the data in the check boxes and windows. He then concurrently logged onto the local shopping network, imported a color brochure depicting his model of bike, and "pasted it" onto the report form. In response to his entry of suspect description data, the format generated a generic suspect model. The citizen scrolled through the various options for descriptions

and constructed a close composite. He closed the report format, and the system registered the incident and then allowed him to save a registered copy for his files.

The captain poured his first cup of coffee and listened of the officer describe his first case closure out of his new Community Based Policing residential assignment. A citizen had reported a stolen bike. The officer reviewed the report from his home terminal and noted a rather complete suspect composite. He ordered a search of the still-video field interrogations (F.I.) within 24 hours of the event, both before and after. A highly possible suspect was found in the search. The officer noted the F.I. subject had a bike in his possession, and he called up a split screen to compare the reported stolen with the F.I. The two bikes were the same model and make. The officer quickly constructed a "six-pac" video lineup and called the citizen. The citizen agreed to view the lineup, and the officer then disabled the citizen's terminal to prevent copy of the data. The citizen viewed the lineup and positively identified the F.I. subject as the suspect in the theft. The officer recorded this identification in full multimedia for the record and initiated a request for warrant on the suspect.

The year 2003 dawned with the chief marvelling at how well the department had weathered the enormous change that was taking place in law enforcement. The long-familiar weight of the old 9 mm pistol on his belt reminded him of his patrol days, but it was the personal telecommunicator on his desk that allowed him to review the events of the previous day, including an interesting pursuit.

Joan Tarvich, police officer, returned to her patrol vehicle from the video-testimony room in the basement of the courthouse. Wistfully, she thought about

the trip to Palm Springs that she would have been sent on by the District Attorney's Office just three years before to testify in the biggest case in her career. Not only had she not gotten the trip, but the teleconferencing set up in the video-testimony was close enough to reality to make the badgering she received from that attorney as disconcerting as if they had been face-to-face.

Joan got into her vehicle and logged onto the police network. She was careful to keep her voice even and concise as she addressed the visor microphone.

"Bob, log on PIN 75993."

"Bob" was the nickname she had assigned her mobile communications device (MCD) in honor of the instructor she had for the 160-hour telecommunications/automation block in the academy.

Bob replied, "Joan Tarvich, log on successful; messages waiting; thank you."

Joan's personal identification number (PIN) was her universal identifier within the entire national telecommunications network. When logging on through the police network (POLNET), the POLNET system would still accept non-work-related communications, but held them in a message-waiting format just as it would work-related items if Joan were not available.

"Bob, display message log."

Joan noted a message from Mr. Ralph Saiz, an elderly victim of a vicious street robbery approximately two weeks before that had remained unsolved.

"Bob, play message; Ralph Saiz."

The video screen closed the message log and began to display the recorded multimedia message. Ralph Saiz could be seen to be visibly shaken, and his voice

trembled as he related that he had thought he had observed the suspect last night working as a valet parking attendant at a local restaurant. Joan attempted to contact Ralph Saiz, but there was no response. Ralph Saiz had one of the few remaining fixed-point home telephone systems left in the city, and all she could do was leave a message on the old-fashioned audio answering machine.

Joan called up the file on Ralph's case.

"Bob, display local record; Ralph Saiz; last entry."

The last entry proved to be a notation of the Crime Prevention Bureau's unsuccessful attempt to include Ralph in an area-wide victim support teleconference as a routine follow-up to his case two days before.

"Bob, display previous entry."

The assault file appeared. Joan paged through the report, the video still photos, and the video identikit suspect mock-up.

"Bob, split screen; display identikit image always."

This command would insure that the identikit image remained on the screen while Joan handled other communications during the day.

Joan made several trips past the restaurant during her shift, but did not see any possible matches among the employees. On the fourth pass she noted one man who seemed to be watching her vehicle too closely to be just a casual observer, but he was not a very close match.

"Bob, display identikit image; both screens."

"Bob, screen two; identikit image; open file."

This would now allow Joan to modify the second image while retaining the original.

"Bob, change; remove face hair."

"Bob, change; head hair black."

Joan had adjusted the image to reflect a suspect who had shaved all facial hair and changed from sandy blonde to black hair. It was a good match, good enough for a field interrogation of a suspect who had possibly made an attempt to alter his appearance.

Joan began to pull into the station parking lot as the suspect, in the midst of parking a patron's car, noted her approach and suddenly screeched out of the lot. Joan activated her "Code 3" equipment, which also automatically instructed "Bob" to begin live video transmission back to the Operations room at the station. In the station, the Operations Supervisor's monitor alarm sounded, and his terminal advised him that Joan was in a pursuit. "Bob" not only transmitted the live video, but provided constant updated information on a side bar to the screen which indicated speed, direction, duration, et cetera. The same wireless connections to the telecommunications system (which had begun as the primitive cellular telephone system of some 20 years ago) that enabled all of the contacts easily provided accurate and timely personal location data to the supervisor as well. He mused briefly about how quiet pursuits were these days. He selected three other assisting units to receive the full video and data stream as part of their dispatch. From his bird's-eye view of the pursuit through Joan's dash-mounted video, he could see that traffic was light and that she was doing a good job of staying with the pursuit while

avoiding hazards. The map graphic display showed that her assisting units were closing in quickly. After the pursuit termination, the supervisor routed the incident record to the command staff briefing folder for the captain.

Joan handcuffed the suspect and led him to the front of her vehicle. She asked another officer to watch him while she did some follow-up investigation. It had been a long pursuit, but it had ended uneventfully. Joan made another call to Ralph's residence. Ralph's wife informed her that he was at his doctor's, and Joan had Bob make the connection. One thing about medical and insurance offices, they always had the biggest and best telecommunications setups. While Joan had Ralph stand by, she began to prepare for her next step.

"Bob, close file; clear screen."

Joan then reactivated the dash camera so that it displayed the suspect standing in front of her car.

"Bob, prepare six-pac file; use dash video subject."

"Bob" then captured a video still of the subject, searched still video files at the station for five close matches, and then constructed the six-pac display on the screen. An understanding supervisor had let her go "EOW" with the promise that she would dictate the short narrative report she needed to make as she drove home. Using her personal communications device, she entered POLNET and finished off another workday in the year 2003.

PART II - STRATEGIC MANAGEMENT

The following strategic management plan is based on the third, or "policy," scenario. The planner's intent is to take a police organization and develop procedures that will bring about the desired future postulated in the scenario. In order to do this, this section begins with a situational audit. This audit includes an assessment of the internal and external environment within which the agency exists, identification and analysis of critical stakeholders, development of an issue specific mission statement with objectives, strategic assumption mapping of the stakeholders, policy alternatives, and negotiating strategies for gaining acceptance. This information is then structured into a strategic plan.

The following describes the building of a strategy to deal with these issues within the "Multimedia Police Department." The name is, of course, fictitious; however, the data gathered and the agency described is real. For several reasons, the author believes this to be the best mechanism for this study.

STRATEGIC PLAN - MISSION STATEMENT

Developing a mission statement is an important first step in the strategic planning process. An effective mission statement defines the fundamental, unique purpose for which a police agency is established and identifies the scope of the agency's operations. It is an enduring statement of purpose that reveals an organization's service and philosophy.

A mission statement should create an agency identity larger than the limits placed on the agency by any individual. An effective statement helps to satisfy

people's needs to deliver service that is worthwhile, to gain recognition, to help others, and to earn respect.

While the mission statement is a broad statement of purpose, philosophical underpinning, and guidelines for organizational direction, a micro mission statement is a subset of the mission statement that focuses attention on a specific aspect of the strategic plan.

The mission statement presented here is issue specific for the purposes of this report.

MACRO MISSION STATEMENT

The principle mission of the Multimedia Police Department is to maximize the quality of life in Multimediaville through the promotion of public safety and the suppression of crime in the most efficient and effective ways possible through the use of state-of-the-art telecommunications and information technologies. This mission shall be met through the successful achievement of the micro mission statements outlined below.

MICRO MISSION STATEMENTS

The Multimedia Police Department (MPD) will establish a proactive posture towards new technological developments and commit appropriate resources to the development of all employees' ability to comprehend, appreciate, and apply state-of-the-art technology and recognize its future potentialities.

- Functional literacy in communications and information management will be a basic job requirement for managers. The management development training program shall include "introductory" and "periodic update" components in this area.

The MPD, recognizing that personnel costs are the greatest burden in providing police services and the greatest impediment to expansion of needed programs, will maximize the use of new communications and information technologies to mitigate such costs and facilitate service delivery.

- All new programs and services will be evaluated in terms of maximized displacement of the need for new personnel by technology.
- All existing programs and services will be periodically examined for effectiveness and efficiency in terms of maximum utilization of available technology.
- Political and financial support will be focused, and the research and development of new technologies to be applied to both current and emerging police service issues.

The MPD recognizes that the power of the new and emerging communications and information management technologies can be harnessed for improper, immoral, or criminal purposes, as well as for the public good; and, as a result, this department will make every effort to discover real and potential abuses of this technology and mechanisms for the prevention of those abuses both inside and outside the organization.

SITUATIONAL ANALYSIS - ENVIRONMENT

The Multimedia Police Department does not exist in vacuum or independent from other entities and forces in the outside world. In attempting to fulfill their stated mission, the first requirement is an assessment of the external environment, an analysis of just what sort of forces the MPD co-exists with and is impacted by. That environment is best defined by looking at the significant events and trends that have a bearing on the mission of the MPD. These events and trends tend to separate themselves into two broad categories: "opportunities" that will aid in the fulfillment of the department mission, and "threats" that will stand in the way or detract from the mission. The following outline format depicts the forces at work in the world of MPD and on its specific mission using the "STEEP" format identified during the Futures File description. The following section depicts an internal "Capability Analysis" that illustrates the strengths and weaknesses of the organization itself.

THE MPD WORLD

I.A. SOCIAL - OPPORTUNITIES

1. Increasing citizen interaction with law enforcement through the use of multimedia interactive communications.
2. The increasing implementation of telecommuting by law enforcement as an alternative and more productive service delivery mechanism. (See also IV.A.1.)

3. The projected incidence of the first "out-of-the-home" Community Based Policing concept, wherein officers operate out of their homes with full communications and information management capability by the year 1996.

4. Increasingly effective follow-up investigations, apprehensions, and convictions as more and more information from various sources and media can be manipulated.

I.B. SOCIAL - THREATS

1. Educational backgrounds of law enforcement personnel are generally not adequate to prepare for involvement in sophisticated technologies.

2. Enhanced ability to use the new technology for sophisticated criminal enterprises, ranging from child pornography to fraud.

3. Public distrust of any enhancement of law enforcement's ability to manage information.

II.A. TECHNOLOGICAL - OPPORTUNITIES

1. Nationwide, fiber-optic-based interactive multimedia public communications system forecasted to be brought "on-line" in late 1998 and accessible to government and the public for two-way communications, media, and information transfer.

2. The ability to establish a "virtual" presence for all purposes except physical intervention.

II.B. TECHNOLOGICAL - THREATS

1. The declining ability of law enforcement to effectively identify and

implement current state-of-the-art technology in their communications and information management systems.

2. The increasing vulnerability of law enforcement systems to "hackers" and other criminal elements.

3. Increased susceptibility of high-tech equipment to physical disasters such as earthquake, fire, et cetera, coupled with increased dependance of the technology for routine performance of duty.

III.A. ECONOMIC - OPPORTUNITIES

1. Increasing ratios (personnel cost savings) for "span of control" in police agency hierarchies brought about by the full implementation of multimedia systems.

2. Gradual elimination of handwritten documents, manual filing systems, manual retrieval of information, and the personnel who performed those tasks.

III.B. ECONOMIC - THREATS

1. The increasing unwillingness and/or inability to fund the full implementation of broadband multimedia systems for law enforcement.

2. High capital cost of implementing system and facilitating periodic upgrades.

IV.A. ENVIRONMENT - OPPORTUNITIES

1. The increasing use of telecommuting by law enforcement as an

alternative service delivery mechanism to address pollution and traffic congestion issues. (See also I.A.2.)

IV.B. ENVIRONMENT - THREATS

1. (No Major Factors)

V.A. POLITICAL - OPPORTUNITIES

1. Law enforcement perceived as more effective and worthy of support as both reactive and proactive programs become more productive.

V.B. POLITICAL - THREATS

1. The public's (and their elected representatives) reluctance to allow law enforcement expanded access to the networks, data bases, and information systems created in the interactive multimedia environment.
2. Confusion over the "best evidence" rule application to electronic data.
3. Police unions suspicious of increasing "techie" presence in law enforcement.
4. Current business community wrangling over who should provide the broadband network (phone company, cable television, broadcast television), creating delays in the investment in the fiber-optic infrastructure.
5. Unclear government regulations and lack of common standard for technology prevent timely investment and deployment of infrastructure.

SITUATIONAL ANALYSIS - ORGANIZATIONAL CAPABILITY

The Multimedia Police Department is the third largest municipal police agency in a major urban area. With 314 employees, 216 of which are sworn personnel, the department has attempted to provide what it defines as "full service" to the community for the last 86 years, but in recent times has had to struggle to maintain this posture. Current staffing represents a sworn/population ratio of 1.1 per thousand, one of the lowest in the Southern California area. Current 1992-1993 department budget is 5% less than it was two years ago. The department enjoyed a reputation in the 1970s as perhaps the most technologically progressive in the area, with helicopters, CAD/MIS, and mobile data terminals in use for almost 20 years. Today, however, that technological expertise and application has seriously eroded under a long-term chief of police who had little interest or aptitude in those areas. In 1990, as the chief's tenure began to approach its conclusion, a serious attempt to rebuild the technological infrastructure of the department began. With a new chief on board in 1992 with a much more literate and supportive posture towards exploiting the power of all available technology, this effort received a major boost. Currently, all upgrade and replacement programs are progressing forward, however slowly, in the face of recession-impacted budgets.

The following charts illustrate a capability analysis that was done using the group of managers, both sworn and civilian, that comprised the N.G.T. Panel. This analysis reflects a serious, although not critical, concern that the department is not now in good shape and is also somewhat resistant to change.

MULTIMEDIA POLICE DEPARTMENT

CAPABILITY ANALYSIS: RATING 1

Instructions

Evaluate for each item, as appropriate, on the basis of the following criteria:

I	Superior. Better than anyone else. Beyond present need.
II	Better than average. Suitable performance. No problems.
III	Average. Acceptable. Equal to competition. Not good, not bad.
IV	Problems here. Not as good as it should be. Deteriorating. Must be improved.
V	Real cause for concern. Situation bad. Crisis. Must take action to improve.

Category	I	II	III	IV	V
Manpower			XX	XXXXX	X
Technology			XX	XXXXXX	
Equipment		XX	XX	XXXX	
Facility				XXXXX	XXX
Money		X	XX	XXX	XX
Calls for service		XX	XXXXX	X	
Supplies			XXXXXXXX		
Management skills		XXXXX	XX	X	
P.O. skills		XXXXX	XXX		
Supervisory skills		X	XXXX	XXX	
Training		XXXX	XXX	X	
Attitudes		XX	XX	XXXX	
Image		XXX	XXXXX		
Council support		XXXX	XXX	X	
C.M. support		XXXX	XXX	X	
Growth potential		XXX	XXX	XX	
Specialties			XXXXXX	XX	
Management flexibility		X	XXXXX	XX	
Sworn/non-sworn ratio		XXX	XXXXX		
Pay scale		XX	XXXXXX		
Benefits		X	XXXXX	XX	
Turnover		XXXXX	XX	X	
Community support		XXXXXX	XX		
Complaints received		XXXX	XXXX		
Sick leave rates		XXXXX	XXX		
Morale		XX	XXXX	XX	

MULTIMEDIA POLICE DEPARTMENT

CAPABILITY ANALYSIS: RATING 2

Instructions

Evaluate each item as to how your peers view "change" in this organization in a strategic planning context.

I Rejects Change
II Adapts to Minor Changes
III Seeks Familiar Change
IV Seeks Related Change
V Seeks Novel Change

Category	I	II	III	IV	V
Top Managers:					
Mentality/Personality		XX	XXX	XXX	
Skills/Talents		XXX	X	XXXX	
Knowledge/Education		XX	XXX	XXX	
Organization Climate:					
Culture/Norms	X	XX	XXXX	X	
Rewards/Incentives	X	XX	XXXX	X	
Power Structure	X	XX	XXXXX		
Organization Competence:					
Structure		XXXX	XXX	X	
Resources		XXXX	XXX	X	
Middle Management		XXX	XXXX	X	
Line Personnel	X	XXX	XXX	X	

SITUATIONAL ANALYSIS - STAKEHOLDERS

The following list of "stakeholders" consists of a collection of people, or groups of people, who have been determined by the N.G.T. Panel to have a strong interest in how the issue of law enforcement telecommunications will develop in the next decade within the MPD. They each are believed to hold several assumptions about both the issue and their relationship to it. Their interest may be motivated by the promise of some benefit or the risk of some loss, sometimes both. As each potential stakeholder is identified, a few of their most critical presumed assumptions about this issue are listed. This technique is known as the Strategic Assumption Surfacing Technique (SAST).

1. CHIEF OF POLICE

   A. He believes his organization is currently a decade or more behind the times and is desperately in need of technological upgrade if it, and he, are to be successful in the future.

   B. He will be supportive of any technological improvement, even at the expense of not being able to get additional personnel.

   C. Wants to be personally involved in, and get recognition for, any improvement in MPD.

2. CITY MANAGER

   A. He has a strong bias towards making large, one-time investments in technology, as opposed to incurring ongoing personnel expenses.

   B. Views interactive multimedia as a way of delivering a host of government services in a much less expensive and decentralized way.

C. Believes that publicly demonstrated support of police department is important to his career in the city.

3. FINANCE DIRECTOR

A. Is not personally comfortable with computerization and does not want to be involved with it. He is skeptical of future potential. He has a division that is far more backward (information-processing-wise) than the police department.

B. Agrees with city manager that one-time expenditures on technology are preferable to continuing expenditures on personnel.

C. Does not see the value in Community Based Policing or other community relations issues and does not support investing scarce resources on technology just to support those ends.

4. CITY INFORMATION SERVICES DIRECTOR

A. Supports interactive multimedia technology utilization by government in general, and MPD in particular.

B. Believes he should have veto power over any communications and information management project in order to prevent misdirected efforts such as those in the past.

5. DEPARTMENT COMMUNICATIONS MANAGER

A. He was hired to come in and rescue department from the abyss of obsolescence. (i.e. -- Most of the other department managers are not up to the challenge of implementing this new technology.)

B. Believes that new technology will expand service delivery, but will not reduce personnel expenses.

6. MPD FIELD SERVICES DIVISION COMMANDER

A. Believes that futuristic technology is getting too high a priority over basics such as patrol cars and voice radio.

B. Would prefer to see funds spent on additional personnel for his understaffed division.

C. Concerned that employees will not be as controllable once an interactive multimedia system supplants current structure.

7. MPD TECHNICAL SERVICES DIVISION COMMANDER

A. Believes that interactive multimedia communications and information management will revolutionize police work and totally change the department structure, all for the better.

B. Does not believe that the organization is now prepared to deal with threats and opportunities presented by the emerging technology.

8. MULTIMEDIAVILLE CITY COUNCIL

A. Wants city to be innovative and on cutting edge of new technology that will improve service and efficiency.

B. Fiscally conservative; expenditures must pay off in revenue generation or cost reductions.

C. Doesn't really understand interactive multimedia technology applications (or any technical process) and relies on staff for recommendations.

9. PUBLIC UTILITIES COMMISSION, STATE OF CALIFORNIA

A. This technology, if not highly regulated, could create an illegal monopoly situation for whoever controls the interactive multimedia communications system.

B. The public needs to be protected from abuse by private enterprise more than it needs to benefit from access to the technology.

10. MULTIMEDIAVILLE CITY EMPLOYEES ASSOCIATION

A. Will be convinced that this technology will eliminate positions in the city and reduce clout of association.

B. Implementing this technology affects conditions of employment and requires "meet and confer" negotiation.

11. AMERICAN CIVIL LIBERTIES UNION

A. This new communications and information technology has many aspects that are invasive and open to abuse by government.

B. The new technology will allow access to new types of data bases that have significant privacy issues that will require ACLU action.

12. MULTIMEDIA BELL (PHONE COMPANY)

A. This new technology is the open door to vastly expanded services and profits.

B. Phone companies can and should be the lawful monopoly providing the entire broadband infrastructure.

C. The investment required to create the infrastructure is justified by

business and entertainment potential, not the needs of government, generally, or police, specifically.

13. MULTIMEDIAVILLE CABLE COMPANY (TELEVISION)

A. This new technology is ideally suited for expanding the existing cable environment.

B. Cable company should be the lawful monopoly providing the broadband infrastructure and not the exploitive phone company.

C. As with the phone company, the needs and desires of government are not the driving force for investment, but the local nature of cable service makes it much easier to address local needs.

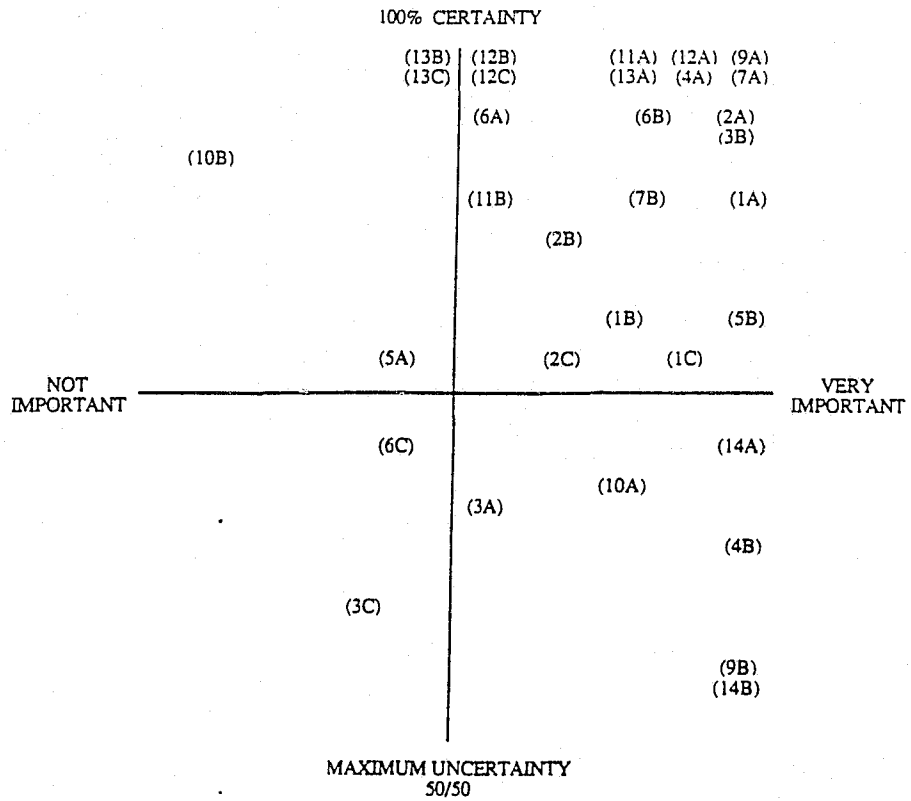
14. THE FORMER CITY MANAGER (SNAIL DARTER)*

A. Often too much money is spent on "toys" (new technology) instead of real service to constituents.

B. Based on his many years of service and political clout, his past associates on the council, in the manager's office, and in positions of community leadership, will consult with him and follow his advice on this issue and the decisions related to it regardless of the current city manager's opinions.

* The designation of "snail darter" infers that this seemingly insignificant out-of-the-loop individual has the ability to drastically impact the department's policy and action. Such a person or group usually is not readily discernable in the absence of SAST analysis.

STRATEGIC ASSUMPTION SURFACING TECHNIQUE
(SAST) MAP



The map illustrated above graphically represents the key assumptions about each stakeholder's (identified below) concerns about the issue. The map's quadrants allow an estimate of both the importance of each concern and the degree of certainty that the assumption is correct. If the stakeholder identification process was accurate, there will appear, as is seen here, a disproportionate number of plots in the "very important – 100% certainty" quadrant.

STAKEHOLDERS

1. Chief of Police
2. City Manager
3. Finance Director
4. City Information Services Director
5. Dept. Communications Manager
6. MPD Field Services Commander
7. MPD Technical Services Commander
8. Multimedia City Council
9. Public Utilities Commission
10. Multimediaville City Emp. Assoc.
11. ACLU
12. Multimedia Bell (Phone Company)
13. Multimedia Cable Company (TV)
14. Former City Manager (Snail Darter)

MODIFIED POLICY DELPHI

The following information provides a synopsis of the modified policy delphi process used to develop alternative strategies. This process is designed to generate strategic alternative approaches to the policy issue, analyze the feasibility and desirability of each alternative, and reduce the number of alternatives to a manageable number for more complete strategic analysis. For this process, a group of law enforcement managers from the N.G.T. Group was used.

INITIAL STRATEGY/POLICY LIST:

1. The city manager and chief of police must establish a proactive posture towards technological development and support the related development of command staff ability to appreciate and apply current state-of-the-art technology and its future potentialities.
2. Command staff must establish the priority of communications and information management as a keystone in the performance of the law enforcement mission and recognize that functional literacy and the ability to recognize security issues in both these areas are basic job requirements for law enforcement supervisors, managers, and executives if the future broadband potential is to be exploited.
3. Given that valid, comprehensive information, easily accessed and processed and communicated in a timely and quality manner is the backbone of the police mission, the emphasis and prioritization within the organization must change from the concentration on development of physical intervention

skills to a more balanced inclusion of information archiving, retrieval, manipulation, and application skills in order to take full advantage of broadband infrastructure potential.

4. Formal planning efforts must reflect the assumption that law enforcement is in a "turbulent" technological environment that will not allow a "status quo" deployment of technology and that a department must facilitate constant research, development, and application of new technologies to both old and emerging police service issues.

5. Personnel costs are the greatest cost burden in providing police services, and, as a result, investment in technology will be justified by command staff as mitigating such costs while promoting support for interactive multimedia and expansion of service capabilities.

6. Police management must create the capacity for identifying and addressing the illicit uses and abuses that new technology can empower for both internal and external forces by creating the necessary investigative and inspection skills in agency personnel.

7. Law enforcement agencies, both local and state, should lobby state and federal government regarding the timely need for an unrestricted broadband infrastructure expanded access to old and new data bases, and grant funding to support the application of new information and communication architectures.

8. City manager and chief of police must establish state-of-the-art applications of technology as a budget priority and insist that all program proposals include

at least an analysis of possible applications of new technology prior to budget approval, to include restructuring possibilities.

Strategies #2 and #5, the highest rated, and #3, the most variant, were selected in the rating process for more detailed analysis. Please see the following "Rating Form" with results of rating process.

RATING FORM

LEGEND
1 = Low
4 = High

#1: Highest Rating #2: Next Highest Rating *: Most Variant

STRATEGY	DESIRABILITY SHORT-TERM	FEASIBILITY	COST BENEFIT	DESIRABILITY LONG-TERM	STAKEHOLDER SUPPORT	SCORE
#1 Technical and Command Staff Development	33243333	22344333	21121122	34434333	43434333	114
#2 Functional Literacy	3443434	43433342	44343332	44444443	43444344	138 #2
#3 Prioritize Information Skills	12334412	42122433	33333442	23342443	23112423	109 *
#4 Planning and Research	33323422	21211232	2112122	44343334	23231222	92
#5 Personnel Costs	44443443	43334243	44443344	44444344	24323332	139 #1
#6 Illicit Uses and Abuses	33343343	21211221	21122112	34444344	32332222	99
#7 Lobby for Grants and Infrastructure	43344343	22112312	44444444	43433444	24343344	130
#8 Budget Priority	43243343	11122212	22323313	43244343	32223324	105

DETAILED STRATEGY ANALYSIS

#1 RATING:

Personnel costs are the greatest cost burden in providing police service, and, as a result, investment in technology will be justified by command staff as mitigating such costs while promoting support for interactive multimedia and expansion of service capabilities.

PROS:

- Long-term cost benefit very positive
- Better service delivery
- Political support for cost reduction
- Financial justification for technology purchase
- Allows use of fiscal conservatism to open door for technological innovation and risk-taking

CONS:

- Needed technology may not always have a personnel cost offset
- Short-term cost benefit is negative
- Line employees may be adversely impacted
- Employee association resistive
- May dehumanize service delivery
- Focus may center on cost savings and not the issue of innovative communications and information management

STAKEHOLDER	PERCEPTION
1. Chief of Police	Supportive and proactive; will discount negatives
2. City Manager	Supportive; likes personnel cost trade-off and must have police department on-line for city system to work

3.	Finance Director	Skeptical; will fund as supplantation of personnel costs, sees no other value
4.	City Information Services Director	Likes concept, but distrusts police management
5.	Department Communications Manager	Pushing for technology, but does not want to oversell personnel offset
6.	Field Services Commander	Would support if he understood how systems would aid his operation
7.	Technical Services Commander	Pushing hard for multimedia, but fearful that it is "over-employees' heads"
8.	Multimediaville City Council	Following city manager lead, but focusing on cost-benefit study; will consult former city manager
9.	Public Utilities Commission	In no rush to allow Bell to jump ahead; unresponsive to government lobbying, but sensitive to business
10.	Multimediaville City Employees Association	Will only support personnel offset through attrition; will use this opportunity to look for new bargaining chips
11.	American Civil Liberties Union	Lobbying Public Utilities Commission to do nothing; will test first case it can involving broadband access to data bases

12.	Multimediaville Bell	Pushing hard to implement broadband for society at large, but police department is too small to be a factor
13.	Multimediaville Cable Company	Wants to use police department to show how they can be more responsive and persuade Public Utilities Commission to give them "go ahead" as sole provider
14.	Former City Manager	Will probably advise against broadband investments, although position is not known; past extreme, short-term fiscal conservatism seems to point this way

#2 RATING:

Command staff must establish the priority of communications and information management as a keystone in the performance of the law enforcement mission and recognize that functional literacy and the ability to recognize security issues in both these areas are basic job requirements for law enforcement supervisors, managers, and executives if the future broadband potential is to be exploited.

PROS:

- Will develop new management culture
- Will counter current deficiencies
- Will demand justification of reasons for current organization structure

- Proactively eliminate potential abuse problems
- Will prepare staff to take full advantage of interactive multimedia as it develops

CONS:

- Training costs
- Resistance from "gunslingers"
- Uninitiated/disinterested personnel will feel threatened
- Creates major changes in promotional and evaluation procedures

STAKEHOLDER		PERCEPTION
1.	Chief of Police	Supportive, but views task as uphill battle
2.	City Manager	Ambivalent; supports computerization, but openly admits that he has no conception of how police work
3.	Finance Director	Could not care less until specific expenditures arise
4.	City Information Services Director	Supportive, helpful; views this as a step forward that will also make his job easier
5.	Department Communications Manager	Major proponent; views this as critical development
6.	Field Services Commander	Reticent, suspicious that this will be carried too far

7.	Technical Services Commander	Major proponent; views this as "crossroads" event that will have great future impact
8.	Multimediaville City Council	Follows city manager's lead; really doesn't care until specific incident points out shortcomings
9.	Public Utilities Commission	Not responsive to this
10.	Multimediaville City Employees Association	Not opposed, but suspicious and emotionally reactive to discussions; wants assurances that current employees' careers will not be damaged by change in thinking
11.	American Civil Liberties Union	No concerns about internal issues
12.	Multimediaville Bell	No concerns; however, will take opportunity to use police strategy to help lobby its own agenda
13.	Multimediaville Cable Company	More direct concern than phone company; possible local sale of fiber infrastructure may follow
14.	Former City Manager	Not concerned about change in organizational philosophy, but may label it as "window dressing" designed to help justify new expenditures

VARIANT RATING:

(This strategy/policy was selected not only because of the wide range of ratings, but as a result of significantly diverse opinions being expressed during the rating process.)

Given that valid, comprehensive information, easily accessed and processed and communicated in a timely and quality manner is the backbone of the police mission, the emphasis and prioritization within the organization must change from the concentration/development of physical intervention skills to a more balanced inclusion of information archiving, retrieval, manipulation, and application skills if the future broadband potential is to be exploited.

PROS:

- Majority of training and selection focus will be in areas of predominant activity
- Will help reduce complaints and litigation from excessive-force incidents
- Further evolution from "gunslinger" to law enforcement professional
- Individual employees will handle average incident better
- Will prepare entire organization for future, expanded applications of technology
- Generate greater support from political forces who are wary of police preoccupation with use of force

CONS:

- Many employees have vested interests, both professional and personal, in the status quo
- May result in too little emphasis on physical intervention skills, resulting in safety hazards
- May be destructive to "gunslinger" self-image/esteem
- Command staff will probably not be of one view on this
- Public will not readily understand shift in emphasis and may view this change as a public safety disaster

STAKEHOLDER	PERCEPTION
1. Chief of Police	Strong proponent, but concerned about dealing with negative reaction from line level
2. City Manager	Strongly in favor; has been politically hurt by "gunslingers" in past and supports technical advances
3. Finance Director	Ambivalent, but more likely to support expenditures for a shooting range than a CAD system
4. City Information Services Director	Strong supporter, but has no concept of how physical intervention fits into picture

5.	Department Communications Manager	Strong supporter; similar though less uninformed than Information Services Director
6.	Field Services Commander	Will have to be educated and reassured that this will be a balanced approach
7.	Technical Services Commander	Strong supporter; will lobby and push for acceptance
8.	Multimediaville City Council	Looks on any shift from "gunslinger" favorably; supports technical development
9.	Public Utilities Commission	No concerns
10.	Multimediaville City Employees Association	Will be vocal about perceived danger to employees; will need to be convinced that it is a balanced approach
11.	American Civil Liberties Union	Won't know what to do; concerned about police becoming more technically competent and obtaining more data access, but also support reduced use of force
12.	Multimediaville Bell	No direct concerns; may provide lobbying opportunity
13.	Multimediaville Cable Company	Will watch with interest, voice support, but take no action
14.	Former City Manager	Unknown; has been as vocal condemning police use of force as he has about "buying toys"

DEVELOPING ALTERNATIVE STRATEGIES - PREFERRED STRATEGY

Strategy #2 and the Variant Strategy both deal with the aspect of changing organizational culture and conceptual focus as a way of opening the door to the accomplishment of the stated mission. As stated previously, law enforcement has been haunted in the last twenty years by the heritage of a "gunslinger" image formed during a prior era that required little more than physical intervention and resolution of problems. Today's law enforcement executives were the line-level "gunslingers" of twenty years ago and often still carry a bias towards hand-on traditional action of some kind.

PREFERRED STRATEGY:

In order to prepare the department to be a functional entity in the Information Age with full capability of exploiting the newest technologies in the next ten years, such as interactive multimedia, the department should adopt a strategy to change its own cultural focus, job descriptions, evaluation mechanisms, and training emphasis to reflect the increased role of advanced technology, obtain a more appropriate balance between traditional physical-intervention activities and the expanding use of communications and information management as a police tool, and re-examine organizational structure in light of the significant impact changes in internal communications and information management systems have on an organization.

IMPLEMENTATION PLAN

Implementing this strategy will require a gradual and multilevel approach. The following outline reflects a model time frame describing who has what role, resources and method of investment, and critical monitoring points. In looking at the Multimediaville Police Department, a five-year window for initial implementation is considered necessary. Yearly re-examination of this strategy throughout the ten-year time frame of this plan must be done as part of the effort to validate it.

YEAR 1/MONTH 1:

The organizational culture and individual employee focus cannot be changed without a wholesale commitment of the city staff and the command staff of the police department. The chief must get commitment from the city manager and council for support and then sell the strategy and its justification to his staff, particularly the Field Services Commander. Immediately following this action, the staff must do their own internal "stakeholder analysis" and prevent or co-opt resistance from special interest groups like the Police Officers Association, who must be assured that this new focus is in addition to, not instead of, concern over officer safety.

YEAR 1/MONTH 2:

The first year will be an "informational" period designed to send a subtle but pervasive message through the following activities:

1. No negative feedback will be used regarding any program or individual that

does not appear "up to speed" in communications or information management.

2. The training budget for the coming year will be formulated to provide balance between traditional "police" training and an equal amount of wide-ranging communications and information management training. This is best done through additional funding, but may be done through supplantation of existing training until balance is achieved.

3. Publish new job descriptions and evaluation criteria that reflect organizational prioritization of the new skills, and put employees on notice that future (minimum of one-year later) promotional and special assignment selections will include evaluation of the new skills.

4. Bring in outside consultant to paint clear picture of exactly where agency is in terms of technological applications for communications and information management.

5. Create a planning committee of the most current and knowledgeable personnel (possibly including outside consultant) to explore the state-of-the-art marketplace and the R & D world and bring back recommendations about what is possible now, and probable in the future, and create a five-year plan for preparing agency technically for broadband implementation. This will be chaired by the Technical Services Division Commander.

6. Every opportunity to include significant communications or information management accomplishments in awards programs or other forms of recognition will be utilized while insuring that the physical intervention

actions, the heroism of police work, are not denigrated in the process.

7. Establish the maintenance and upkeep of existing technological systems as a budget priority.

8. Establish futurism and forecasting as legitimate management tools by promoting training (such as Command College) and requiring their use in all planning efforts.

YEAR II/MONTH 2:

With the educational first year behind, it is now time to formalize much of the prior year's familiarization activities and continue with others, as listed.

1. Non-threatening critiques of individual manager's efforts to acquire training and involve themselves in existing communications should now begin in earnest, with an emphasis on the balance needed with other skills.

2. The training program now includes budgeted mandatory developmental training for managers.

3. Communications and data/information management skills are now clear job dimensions reflected in promotional/hiring bulletins, even at line level.

4. Planning committee reviews previous year to monitor success of activities and reports to the chief. Five-year plan is updated with new data on state of broadband interactive multimedia infrastructure development and estimate of possible police applications and time lines. This date included in long-term capital budget plan.

5. Command staff will review the structure of the organization in the second and subsequent years to insure that full advantage has been gleaned from

potential expanded spans of control, flattened chains of command, and reduced personnel needs.

YEAR III:

By this time, it is expected that a full organizational shift in focus will have occurred. Managers will be held responsible for literacy and competency in the communications and information management fields, and this will now be applied to the lower ranks, as well as to a lesser degree.

All the ongoing activities described in the first two years will continue as routine, standing activities during the foreseeable future (in this context, yearly through the year 2003 and beyond).

1. Training budget constructed to reflect balanced approach to the communications and information management skills (approximately 50%).
2. Personnel held accountable for minimum skill level in this area.
3. Planning committee continues to monitor where agency is in time (technologically) and potential for expanded capability as broadband infrastructure approaches. Each year a new five-year communications and information management plan is produced, with complete forecasting data for the field.
4. Reward/recognition systems continue to include recognition of these activities.
5. Budget construction occurs based on planning committee data and with commitment of necessary dollars and personnel cost offsets where appropriate.

YEAR V:

By the close of Year V this process should now have become routine and expected by members of the organization. The greatest danger will be the onset of complacency if a mentality of "What a great job we just finished" sets in. At this stage, it is important for the chief of police to insure that new life is continually breathed into the process, to include a re-emphasis on the ongoing evolutionary nature of the process.

YEAR VI:

In this year, a detailed analysis by command staff should be made regarding the effectiveness and accuracy of the original five-year plan completed in Year I. This will continue each year, in addition to ongoing implementation of activities initiated in Year III. This will provide guidance on quality of process as well as validity of strategy.

YEAR VII - X:

Continuation of support of ongoing strategic planning process.

PART III - TRANSITION MANAGEMENT

During this analysis of the future form and impact of law enforcement telecommunications, specifically the potential of broadband interactive multimedia, it readily became apparent that a plan was required that would encourage law enforcement to implement a strategic plan formulated for the identification of new emerging technologies, such as interactive multimedia, and exploration of every avenue for the full exploitation of such a new tool for the fulfillment of the law enforcement mission.

The following document describes a strategy to deal with these issues within the "Multimedia Police Department."

In order to prepare the department to be a functional entity in the Information Age with full capability of exploiting the newest technologies in the next ten years, such as interactive multimedia, the department must change its own cultural focus, job descriptions, evaluation mechanisms, and training emphasis to reflect the increased role of advanced technology, obtain a more appropriate balance between traditional physical-intervention activities and the expanding use of communications and information management as a police tool, and re-examine organizational structure in light of the significant impact changes in internal communications and information management systems have on an organization.(19)

First, the Multimedia Police Department (MPD) will establish a proactive posture towards new technological developments and commit appropriate resources to the development of all employees' ability to comprehend, appreciate,

and apply state-of-the-art technology and recognize its future potentialities. This will include functional literacy in communications and information management as a basic job requirement for managers. In addition, a management development training program shall include "introductory" and "periodic update" components in this area.

Next, the MPD, recognizing that personnel costs are the greatest burden in providing police services and the greatest impediment to expansion of needed programs, will maximize the use of new communications and information technologies to mitigate such costs and facilitate service delivery. This will be accomplished by insuring that all new programs and services are evaluated in terms of maximized displacement of the need for new personnel by technology. All existing programs and services will be periodically examined for effectiveness and efficiency in terms of maximum utilization of available technology. Lastly, political and financial support will be focused upon the research and development of new technologies to be applied to both current and emerging police service issues.(20)

Finally, in recognition that the power of the new and emerging communications and information management technologies can be harnessed for improper, immoral, or criminal purposes, as well as for the public good, this department will make every effort to discover real and potential abuses of this technology and establish mechanisms for the prevention and suppression of those abuses both inside and outside the organization.

To accomplish these goals, a thorough analysis of the organization and its component members must be made.

"CRITICAL MASS" ASSESSMENT

The following individuals were identified in the strategic planning process as the major stakeholders:

1. Chief of Police
2. City Manager
3. Finance Director
4. City Information Services Director
5. Police Communications Manager
6. Field Services Division Commander
7. Technical Services Division Commander
8. Mayor (Council)
9. Public Utilities Commission Chairman
10. President of Employees Association
11. Local American Civil Liberties Union Representative
12. Multimediaville Bell Company President
13. Multimediaville Cable Company President
14. Former City Manager (Snail Darter)

Of these 14 individuals identified as stakeholders, or "snail darters," and consideration of other possible key players, the following were identified as members of the "critical mass" (that group of individuals who could influence or "bring along" all the rest of the stakeholders:

1. Chief of Police
2. City Manager
3. Police Communications Manager
4. Mayor
5. President of Employees Association
6. Former City Manager

The following section contains the commitment profile of each of these individuals, coupled with a narrative explanation of what their respective plots actually represent and how they interact in the overall process.

COMMITMENT AND READINESS ASSESSMENT

CHIEF OF POLICE: The chief's current position reflects support for the concept, a proactive participation in the implementation, and a superficial understanding of the potential benefits. In the end analysis, however, he himself has many of the characteristics described in the introduction. While he has come a long way in his development, he often falls back on his historic reaction/ intervention approach to problem-solving techniques when pressured. He is very sensitive to any potential for political embarrassment, something he had often had to deal with when the former city manager was in office.

The chief's level of commitment must be raised to Level 4. For the plan to succeed, the management staff of the department must be brought along and supported during the transition and beyond. He must demonstrate that this is a valuable and necessary change that must be successful if the department and the managers are to be successful. Some of the crucial managers in this process will only finish crossing the bridge upon learning that it is being burned behind them. More importantly, he needs to assert himself as the Chief Executive Officer with the communications manager and place him in the role of trusted senior advisor instead of allowing him full autonomy. Convincing the chief that not being successful with this strategy will cause him great embarrassment will tip the scale completely to Level 4.

CITY MANAGER: The city manager is the only player who is perfectly poised to bring the project to fruition. He is very literate about the subject and is very visibly in support of the strategy. He knows that it is the chief and communications

manager that need to ram-rod this effort. He has been able to effectively manage and focus the council. His major task is to continue openly supporting the plan and to encourage the chief to increase his personal involvement and commitment.

POLICE COMMUNICATIONS MANAGER: This individual plays a very important and specialized role. He is the department's civilian technical expert for automation and communications, and his involvement and support in this plan is very critical. While one would normally assume that this person would follow the marching orders of the chief, in this case much of the technical decision-making authority has been abrogated to him. A past history of serious problems in the selection and operation of such equipment actually resulted in the creation of this position. For this reason, in technical areas, he has almost as much authority and autonomy as the chief. He is very supportive of this plan and, in fact, feels that he has a lot of "ownership" and responsibility for it.

The communications manager must be moved back from Level 4 to Level 3. His commitment and technical expertise are very high; however, he is not the appropriate leader for this plan. Many reasons contribute to this conclusion. He is a relative newcomer to the department and to the law enforcement profession, and thus has a limited perspective on the real law enforcement uses of the technology and limited credibility with the sworn hierarchy. There is great risk that he will alienate instead of converting employees into eager followers. Fortunately, he realizes these facts as well.

MAYOR: The mayor is a very supportive player. Through force of personality and political skill he usually can focus the council in the direction of his

choosing. He is also a retired engineer from the aerospace industry and, as such, has a strong technical expertise and interest. He tends to try in insert himself and micro-manage major technical projects of this nature.

While the mayor's and the council's support for the project is crucial, for fiscal support if nothing else, the mayor's interference and over-involvement can be devastating. His style is not conducive to participative user-based project management. The plan calls for his movement from Level 3 to Level 2. This may not be completely possible, but should be attempted by the city manager and the chief.

PRESIDENT OF EMPLOYEES ASSOCIATION: The president is a line-level patrol officer, young, but well educated, computer literate, and very dynamic. He appreciates the value of the technology, but also believes that the substantial changes in working conditions and possible work-force reductions demand that the labor organization take a negative stance until more is known and the association can develop adequate protections for the members. He has both formal and informal mechanisms to effectively block the progress of the project.

This individual needs to be moved the furthest, from Level 1 to Level 3, but may not necessarily be the most difficult to deal with. His objections are based primarily on fears generated by a lack of information of project impacts. A plan to keep the association fully informed and involved in the process may satisfy the president's concerns if done honestly and as early as possible. He is personally predisposed to support the project if his responsibility to his members can be accommodated.

FORMER CITY MANAGER: The former (retired) city manager is an identified "snail darter." He was known to be very resistant to advanced technology and any spending that was not directly related to visible service delivery. He has reacted negatively to many of the changes the new current city manager has made since taking office. The former city manager still has the ear of the council and the mayor due to the inexperience of the new replacement. He could raise significant doubts in their minds about the advisability of proceeding with the plan.

There is almost no potential for this individual to help bring this project together. All energies need to be focused on forestalling any negative lobbying he may do with council. A concerted effort needs to be made to illustrate to him the potential service improvements and possible personnel expense tradeoffs. Keeping the current city manager out of a leadership position and the mayor out of an active position will minimize the former city manager's desire to interfere and also limit his impact once the project has started.

COMMITMENT PLANNING

LEGEND
X = Current Position
O = Where You Want Them
→ = Work/Movement Required

TYPE OF COMMITMENT

Actors in Critical Mass	1 Block Change	2 Let Change Happen	3 Help Change Happen	4 Make Change Happen (Must Have)
Chief of Police			X →	→ O
City Manager			XO	
Police Communications Manager			O ←	← X
Mayor		O ←	← X	
President of Employees Association	X →	→	→ O	
Former City Manager	X →	→ O		

Will Cause Failure if Acts Against

Will Achieve Success if Acts in Favor

READINESS/CAPABILITY CHART

The following chart lists the individuals who are critical to the change effort. Each is ranked (high, medium, or low) according to their readiness and capability with respect to the change.

	Readiness			Capability		
	High	Medium	Low	High	Medium	Low
1. Chief of Police		X		X		
2. City Manager	X			X		
3. Police Communications Manager		X		X		
4. Mayor		X		X		
5. President of Employees Association			X		X	
6. Former City Manager			X	X		

TRANSITION MANAGEMENT STRUCTURE/IMPLEMENTATION

The structure selected to perform the management function is a blend of several types of configurations. At the top, a project manager will be the Technical Services Division (TSD) Commander. He is one of the original 14 stakeholders, has functional responsibility for the subject matter, is the supervisor (at least in theory) of the communications manager, has a wealth of experience in managing project teams, has good personal relationships with all the "critical mass" players, and most importantly, will allow the chief to facilitate much of the movement depicted on the commitment chart. The chief can still maintain his "make it happen" status through his management of the TSD Commander. Together, they can limit the communications manager to a highly respected but purely technical advisory role.

For several reasons that include the development of ownership,

involvement, interest, and acceptance of the project, as well as the gathering of important stakeholder/user input, other structures must also be used. In this particular case, a blend of the "constituent representative" style and the "diagonal slice" style will be used. Under the chairmanship of the TSD Commander, a users' advisory group will be formed to provide input and evaluation. It is important to specifically represent the stakeholders and their respective groups. At the same time, in recognition that this project will have repercussions in all areas of the department and beyond, it is necessary to also assemble a cross-section of the cultures and functions in the organization. This technique also allows for the involvement of natural leaders without any "legitimization" of their power. It also insures that previously "invisible" (to managers only usually) issues are brought up and dealt with before they become deal breakers.

While the user group may of necessity become cumbersome as designed, it is important not to let efficiency and expediency be the only driving considerations. This project has the potential to create vast change throughout the organization and, perhaps more importantly, create an environment of constant ongoing change that can be very disruptive. Suffering through some process difficulties while working through this group can be more than paid for with much more universal acceptance and cooperation down the road.

The first step in this transition process will involve the creation of a small transition management plan team that will, in essence, do the very things elucidated earlier in this document, the creation of a commitment plan. This small circle, probably involving only the chief of police, the current city manager, and the TSD Commander, would engage in all the components illustrated in the strategic-planning exercise. In essence, they must prepare to begin the implementation of the strategy.

This small team will only proceed through the initial stages of developing the plan. Once the target group is identified and the critical mass defined, it will be time to expand the transition management team to its full scope as described earlier. This will be the time to engage in the process of constructing a responsibility chart. While this strategy requires a lot more "soft" types of activity, the chart will still be useful. At this stage, the chief should lead the analysis and assignment exercise that will produce the chart. Concurrently, carefully structured "confrontation meetings" will be very effective in educating the work force and gaining input on process issues that can be incorporated in the Responsibility Chart.

The roles and tasks of the actors must be clearly defined. The implementation of the aforementioned steps will require a determination as to who is responsible for each of the tasks. The Responsibility Chart labels the task and indicates what is expected of the critical mass members (as previously identified). For this purpose, the RASI system was used. RASI is an acronym for:

R = Responsibility for ensuring the completion of the task.

A = Approval is necessary from this person or group.

S = Support of this group or person is essential.

I = No responsibility attached here; neither approval nor support is necessary. Subject/s must be kept informed.

Responsibility Charting not only identifies who is responsible for what, it also illustrates the interplay between the parties who make up the critical mass. Included in this RASI evaluation is the Field Services Commander, who was not listed as a critical mass member. His inclusion on this chart is only to give a realistic assessment as to who will do the tasks listed under "decision." Conversely, one critical mass member, the former city manager, is not included as he has no "responsibilities" in this context.

RESPONSIBILITY CHART

LEGEND
R = Responsibility (Not Necessarily Authority)
A = Approval (Right to Vote)
S = Support (Put Resources Toward)
I = Inform (To be Consulted)
- = Not Applicable

ACTORS / DECISION-ACTION	CHIEF OF POLICE	CITY MANAGER	TSD CMDR.	POLICE COM. MANAGER	ASSOC. PRESIDENT	FSD CMDR.	MAYOR
DEVELOP STRATEGY	R	A	S	S	I	S	I
CITY HALL COMMITMENT	S	R	I	I	I	I	S
NEW TRAINING PLAN	A	A	R	S	I	S	I
NEW JOB DESCRIPTIONS	A	A	R	S	A	S	I
NEW PERFORMANCE EVALUATION CRITERIA	A	A	R	S	A	S	I
CONSULTANT	A	A	R	R	I	I	A
PLANNING COMMITTEE	A	-	R	R	-	S	-
REWARDS	A	A	R	R	I	R	S
BUDGET PRIORITY	R	A	S	S	I	S	S
LEGITIMIZE FORECASTING	R	A	R	R	S	R	R

The nature of this strategy dictates that this must be a long-term and organization-wide process. The technology has the power to very literally change the basic nature of many current jobs, the organizational hierarchy, and the work-place relationships of the employees. This means the fear and resistance potential will be extremely high, and thus the commitment plan must reach down to the lowest/widest level of the organization.(21)

The nature of the strategy is such that a great deal of conceptual and cultural change needs to take place before the much more manageable "nuts and bolts" changes take place. One of the problems is that the problem as it has been defined is not one that glares the average employee in the face. Such a state of affairs requires a significant effort to raise the consciousness of the work force so they recognize how great the future could be if only they changed their perspectives and exploited the new technology.(22) This is an ideal beginning for the user group. The communications manager, with his high technical credibility, is the ideal person to lead a series of employee meetings outlining how much better things would be today if the department had gotten "on board" years ago, and then to explain how it's not too late to play catch up and let a great new technology enhance everyone's job.

A second collateral mechanism would be to shift the focus of training expenditures. Mandated and necessary items would remain, but the significant "discretionary" training available could be refocused to provide exposure and wishful interest on the part of key employees.

Concurrently, performance evaluations need to begin to reflect how much

the organization values people who accept and assist in the implementation of the strategy. No negative sanctions should occur in the early stages of transition.

Only at this point, after the organization's culture begins to indicate to all employees that the new strategy is the new path to success and job satisfaction, can the department proceed.

In the end analysis, the last but most important feature will have to be constant pressure on the management staff by the chief and city manager to function as role models to the balance of the organization. This means that not only their conduct and statements reflect buy-in for the strategy, but that all their reward and punishment systems reflect it as well.

The initial small transition management team needs to review the transition process on a formal basis at least quarterly to insure that the mission statements are being fulfilled by the implementation of the strategy.

CONCLUSION AND IMPLICATIONS FOR FUTURE STUDIES

The foregoing report details several possible futures that the advent of the "Information Super Highway" may thrust upon law enforcement. This research has been in no way fully inclusive of the possible futures. It has, however, pointed law enforcement telecommunications thinking in a new direction and illustrated several effective mechanisms that can be used to deal with the changes of all types that confront our organizations.

It is obvious from the results of the various processes used that the issue is a valid one. The "Information Super Highway" is coming,[23] and not many of the decision makers in law enforcement know about it. Equally apparent, however, is that this need not result in disaster. For people with the ability to envision the future in an open minded and constructive way, there is ample opportunity to be successful and to benefit their agency.

This technical report has strayed somewhat from the normal format. The issue addressed was unusually broad, but necessarily so. This technical report was then modified to be much more of a demonstration to the reader of how some of the narrower sub-issues could be addressed within a rugged and reliable system for forecasting, and change management while still offering validation for importance of the main issue.

It is this author's opinion, and hope, that a host of new I.S.P. projects will take this broad effort as just the first rudimentary stepping stone in the evolution of this issue. Practically every previously studied issue in prior I.S.P. efforts can be revisited in major new ways, incorporating the potentialities of broadband interactive

multimedia. This report superficially touched on several existing areas, such as Community Based Policing, Police Vehicular Pursuits, Telecommuting, Neighborhood Watch, et cetera, that could easily be approached in entirely new ways using the "Information Super Highway" as a basic premise. A more comprehensive list is included in the appendix.

Sadly, the needs of government, generally, and public safety in particular, will not be the motivation for the emergence of this new telecommunications world. It is the profit motive that is propelling the major research and development within economically promising areas such as medicine, insurance, education, entertainment, and business administration. These are the arenas that law enforcement needs to monitor and borrow from.(24)

It is this author's belief that this research effort, however flawed aspects of it may be, today represents the cutting edge of law enforcement forecasting in the telecommunications arena. It is this author's hope that this research effort will rapidly become an obsolete and mundane document whose only saving grace will be that it motivated others to shift their eyes from the desk top to the blue sky above, sparking the kind of imagination and vision of the future that will let them take this issue far beyond this fledgling effort.

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APPENDIX 1

POTENTIAL FUTURE I.S.P. TOPICS

1. Impact of Emerging Personal Communications Architectures on "9-1-1" Systems
2. Impact of Digital Records on "Best Evidence" Rule
3. Impact of the "Information Super Highway" on the Use, Production, and Distribution of Child Pornography
4. Impact of Digital Modifications to Voice and Video Transmissions
5. Impact of Interactive Video on Neighborhood Watch Programs
6. Impact of "Information Super Highway" on Security Systems and Alarm Responses
7. Impact of "Information Super Highway" on the Need for Separate Police Communications Systems
8. Impact of Imaging Technology and "Information Super Highway" on Criminal Trial Procedure
9. Impact of "Information Super Highway" on Current Law Enforcement Hierarchy
10. Impact of "Information Super Highway" on Privacy Issues
11. Impact of Interactive Video and Telecommuting on Community Based Policing Activities
12. Impact of a Fully Interactive Digital Telecommunications System on Frauds and Other Financial Crimes

13. Impact of "Information Super Highway" on Concept of "Virtual Patrol"

14. Impact of "Information Super Highway" on Corrections Alternatives

15. Impact of "Information Super Highway" on Fugitive/Missing Persons Investigations

16. Et cetera...

APPENDIX 2

EVENTS

1. Nationwide Broadband Interactive Multimedia "Information Super Highway" turned "On"
2. Apple Introduces Real "Knowledge Navigator" for Purchase
3. Hacker Destroys LAPD Data Base Including Local Records
4. MMPD Realizes +50% in Case Solvability After Coming On-Line
5. First Multimedia 9-1-1 Call Results in Dispatcher Videoing/Witnessing Assault in Home
6. 2 CM Transponder Implant for Earlobe
7. Major Theft of Law Enforcement Information
8. Telepathy Breakthrough
9. Major Case Decision Limits Information Access
10. LAPD Replaces 10% of Work Force with Data System
11. ACLU Sponsors Legislation to Limit Record Keeping
12. Private Invest. Abuse of Data
13. Foreign Power Hacks U.S. Data
14. California DMV Requires DNA Hair/Blood for CDL
15. LAPD/MMPD Combine to Fund Data System
16. Serial Murder Suspect Profiled/Identified in Data Base Search
17. F.B.I. Spends $350 Million on Data Base and is Injuncted from Use by ACLU Suit

18. Major Federal Grant Provides Funding for Community/Police Interactive Computer System

19. Supreme Court Restrictions to Obtain Blood-Voice-Retina Sampling

20. Law Enforcement Data Base Security Comprised by 14-year-old with Radio Shack Equipment

21. Solar Powered, Hand-Held, Voice Recognition M.D.T. Introduced by Tex. Instrument

22. Major Disaster Reveals Down-Sized Law Enforcement Agency Unable to Respond to Emergency Lifesaving Needs

23. LASO Initiates "Technology" Block in Basic Academy for Computer/Data Management Literacy

24. Chief of Medium-Sized Agency Fired for Spending $2 Million on Obsolete System

25. Multimedia Police Department Initiates "Out of the Home" Community Based Policing Deployment

26. First Patrol Vehicle Equipped with Interactive Multimedia Communications System is Deployed

27. Worm Optical Data Declared "Best Evidence Original Documents" by Supreme Court

28. Innocent Suspect Convicted Through Manipulation of Digitized Records

29. Police Chief Eliminates "Middle Management" (Lieutenant) Positions

APPENDIX 3

TRENDS

1. Ratio of Detective Positions in Police Departments
2. Level of Detection of Career Criminals/Serial Criminals by Data Base Analysis
3. Tendency for Police Agencies to Become "Flatter" as Less Direct Human Management is Required to Manage and Transmit Data
4. Demand for Technology to Track Suspects
5. Willingness to Budget for Full Implementation of Broadband Multimedia in Law Enforcement
6. Fear of Implementation of These Systems by Civil Rights Groups
7. Public Willingness to Allow More and More Data Bases Being Accessible to Law Enforcement
8. Ability of Citizens to Interact with Law Enforcement Agencies through Interactive (two-way) Communication Systems
9. Law Enforcement Fear of Data Base Systems (Hackers)
10. Lack of Awareness by Police Departments of New Technology and its Benefits
11. Threat Level Posed by Sophisticated Data Base Viruses to Systems
12. Voice Recognition Transcription Device Utilization for Standard Reporting
13. Use of Multilingual Robotic "Desk Officer" Technology

14. Concern About Clerks Replaced by Fewer "Technicians"

15. DNA Typing Prevalent

16. Leg/Judiciary Willingness to Approve Use of Systems

17. Fear of Multimedia Technology Reducing "Community Based Policing" Impact

18. Sworn to "Techies" Ratio Changes

19. Unions Concern with "Techies"

20. Education Level of Law Enforcement

21. Telecommuting of Police Work Force

22. Ability of Law Enforcement to Implement Current Technology

23. Entry Level Police Officers Failure Rate Because of Not Being Computer Literate

24. Multimedia Environment Impact on Porno/Child Exploitation

25. Multimedia Impacts on Traditional Parameters for "Span and Control"

26. Public Safety Agencies Concern Over Being Supplanted by Private Investigation/Security Firms Who Make Use of New Technology

27. Interactive Multimedia Impact on Police Takeover of all Private Alarm Systems

28. Government Expectation that Record-Handling Personnel will Decline in Numbers

APPENDIX 4

N.G.T. PANEL

1. Training Commander - Los Angeles Police Department
2. Patrol Captain - Los Angeles Police Department
3. Narcotics Lieutenant - Glendale Police Department
4. Business Manager - Beverly Hills (Private Firm)
5. Communications Administrator - Glendale Police Department (Civilian)
6. Station Commander - California Highway Patrol
7. Patrol Lieutenant - Whittier Police Department
8. Communications Captain - Los Angeles Police Department
9. Patrol Captain - Santa Monica Police Department

APPENDIX 5

UNCONVENTIONAL GROUP LIST
"GENIUS SCAN"

The following individuals all provided detailed information regarding some aspects of the project issue during face-to-face contacts. Their titles or work group and employer are identified to illustrate the broad nature of the inquiry and the extent of consensus, or lack, when cited in the body of this report. To the best of my knowledge, confirmed by many of the sources themselves, this group is representative of the state-of-the-art of broadband multimedia communications in the United States today. These individuals were, for the most part, contacted during National Engineering Consortium conferences. In addition to information gathered, most also provided extensive unpublished outlines of their research area.

Arnett, Nick	Chief Analyst Multimedia Computing Corporation (Future Role of Multimedia in Society)
Azevedo, J. W.	High Bandwidth Services Pacific Bell (Broadband Applications)
Barnich, Terrence L.	Commissioner, Illinois Commerce Commission (Regulating New Telecommunications in the 1990s)
Bigham, John A.	Next Generation Technologies Bell Atlantic (Fiber-Optic Networks)
Boehm, Rodney	Director, Strategic Planning Fujitsu Network Transmission Systems, Inc. (Fiber-Optic Broadband Systems)
Bovenizer, Robert F.	Training & Education Manager Bellcore (Broadband Architecture)
Boyer, Gerald R.	Director; Access Network Technology Bellcore (Planning Residential Broadband Access)
Bravos, Angelo G., PhD	Technology Manager Ameritech Services (Interactive Multimedia Applications)
Caram, Bruce E.	Director; Ina Target Architecture Department, Bell Communications Research (System Architecture)
Cohen, Philip R.	Computer Dialogue Laboratory SRI International (Interfacing Multimedia)
Curtis, Terry	Professor: Department of Communications Design California State University, Chico (Broadband Players, Stakeholders, and Government Policy Issues)

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APPENDIX 6

GLOSSARY

(Terms the Enlightened Police Manager Should be Familiar With)

ANSI: American National Standards Institute. An organization which sets voluntary standards for industry in the United States. Its T-1 committee is charged with developing U.S. telecommunications standards.

Architecture: The physical structure, design, and interconnection of the internal components of a hardware/software system.

Artificial Intelligence: The capability of a device to perform functions that are normally associated with human intelligence, such as reasoning, learning, and self-improvement.

Asynchronous: A method of operation in which processes begin in response to events external to themselves. Contrast with synchronous.

Asynchronous Transmission: A technique of data transmission between two computer systems that operate completely independent of each other and do not share any timing information. Each system sends data in packets which have uniquely marked start and stop bits. Contrast with "synchronous transmission."

ATM: Asynchronous Transfer Mode. A transport and switching method in which information does not occur periodically with respect to some reference such as a frame pattern.

Automation: Replacing manual operations with computer-controlled machine actions.

Band: A range of frequencies between two specified limits.

Bandwidth: The difference, in hertz, between the highest and lowest frequencies in a band.

Baseband: Denoting communications facilities with a narrow bandwidth (which is less than voice grade), and is combined with a carrier signal (a fixed signal which is mixed with the information signals to produce a signal capable of transmission).

Baud: A unit of signaling speed generally equal to one bit per second. Thus, 8 baud equals 1 character per second.

BISDN: Broadband Integrated Services Digital Network. A common digital

network suitable for voice, video, and high-speed data services running at rates beginning at 155 MB/s.

Broadband: Denoting communications facilities with a bandwidth which is capable of handling frequencies greater than those associated with normal voice range transmission facilities; e.g., integrated voice, video, and data communications.

A communications channel that has greater bandwidth than a voice-grade line and is capable of greater transmission rates.

Coaxial Cable: Cable composed of one wire, called a conductor, surrounded by a stranded shield that acts as a ground. The conductor and the ground are separated by a thick, insulating material, and the entire cable is protected by an insulating jacket. Coaxial cable is usually used in broadband or high-speed applications.

Connectionless Service: A type of service in which no predetermined path or link has been established for transfer of information (contrast below).

Connection-Oriented Service: A type of service in which information always traverses the same pre-established path or link between two points (contrast above).

Data Navigation: (Information Navigation) The act of locating specific data, or information, from varied and extensive data bases.

Data Transfer Rate: The speed at which a computer reads or writes data to a storage medium.

Digital Data: Data represented in a discrete, discontinuous form, as contrasted with analog data which is represented in a continuous form.

Digital Subscriber Line: (T-1, etc.)

Digitizer: A device which converts visual images into digital data and inputs those images into the computer.

Duplex: Deals with the capability of a communications channel to handle two signals headed in opposite directions at the same time. Full duplex modems can transit and receive data at the same time. Half duplex modems alternately transmit and receive data.

Electronic Mail: The transmission and storage of messages through use of computers and telecommunications.

End-users: Individuals who use information technologies to perform their work.

ESDI: Enhanced Small Device Interface. A peripheral device interface standard which allows for high data transfer rates.

Fiber in the Loop: Use of fiber in general telecom system.

Fiber Optic Cable: A cable made of glass or plastic fibers which can transmit large amounts of data by light pulses. The current optimum medium for broadband telecommunications.

Fiber to the Curb: Fiber-optic telecommunications system in which the fiber is brought to the neighborhood and distributed to the individual subscriber by some other means.

Fiber to the Home: Fiber-optic telecommunications system in which the fiber is actually brought to the individual subscriber's location.

Frame: A variable length group of data bits with a specific format containing flags at beginning and end to provide demarcation.

GB: Gigabyte. One billion bytes, or one thousand megabytes.

Graphics: Pictures or diagrams, as opposed to alphanumeric characters.

Hertz: Cycles per second, abbreviated as Hz.

Hypermedia: Hypermedia is a marriage of interactive multimedia and hypertext, coupling the advantages of interactivity and associativity with sensual realism, particularly the two key communicative senses of sight and sound.

Hypertext: Hypertext is a concept for navigating around computer-based text resources, with the path the user follows affected by links of meaning. The primary principle of hypertext is the art/science of *associativity*, the ability to make leaps in useful ways without losing, confusing, or boring the user.

Informate: To create information through automation; the development, through use of information technology, of marketable skills and information.

Infostructure: Information infrastructure or architecture.

Interactive: An application where an input or inquiry by a user causes an immediate action by the system in response to the input. Used most commonly here in the context of interactive television, or "two-way" video in home and office.

Interface: 1) A common boundary between two systems or devices. 2) A specific hardware or software connection or a connection between systems or devices. 3) The combination of hardware and software which is used to present the

operating system and programs to the user. Example: the keyboard, mouse, and icon-riven display on an Apple Macintosh. 4) To make two devices or components capable of communicating.

Isochronous: Signals carrying embedded timing information or dependant on uniform timing. Data has no embedded timing -- send it slower and it is still valid, just late. Voice and video are intimately tied to timing. Send voice slower and it sounds very different. With TDM services, there is a direct relationship between the signal rate used to digitize the voice samples and the bearer channel rate, allowing accurate reconstruction of the voice (or other signals) at the far end. With packet technologies, no such relationship exists. Services like ATM must use care in transferring such signals so timing can be recovered, since it cannot be derived from the ATM bearer channel.

KB: Kilobyte. A unit of measure for memory or disk storage capacity. Two to the 10th power or 1024 in decimal.

LAN: Local Area Network. A collection of computers which are connected so that they may communicate and share peripheral devices (such as hard disks and printers) and possibly access remote hosts or other networks.

Light Pen: A hand-held pointing device designed to be pressed against the CRT, which senses the beam of light generated by the CRT and translates the time it takes for the beam to strike the sensor in the light pen into a coordinate position on the screen.

Link: To connect one location with another for the transfer of data. To give access to a directory or device.

Loop: The telecom network.

MB: Megabyte. A unit of measure for memory or disk storage capacity two to the 20th power or 1,048,576 in decimal.

Media: Media stands for various man-made means of communicating.

Message Packet: The basic unit of information in a network environment.

Metacomputer: One machine which transparently (unknowing to user) accesses all computational resources.

MIPS: Millions of Instructions Per Second. A method of measuring processing power.

Modem: MODulator/DEModulator. A hardware device that transforms digital data

from a computer into analog format to transmit or receive data by telephone lines. There are both internal and external modems.

Multimedia: An integration of two or more of the five information types: text, graphics, animation, audio, and still/moving images. It usually requires broadband capability.

Multiplexer: A device which allows simultaneous or interleaved transmission of multiple signals over a single transmission medium.

Narrowband: Used to describe transmission media which can only transmit low volumes of data. Contrast with "wideband."

Narrowcast: Transmition of interactive video point to point, such as from one residence to another. (See video dial tone.)

Network Communication: Data transmission between network stations. Request for services and data are passed from one network station to another through communications medium.

Node: Any computer, terminal, workstation, or communications controller in a computer network.

Nomadic Computing: Open network interface that allows computer to search many different sources (networks, data bases, etc.) to satisfy command, i.e.: "Locate John Smith and leave message..."

OC: Optical Carrier. A SONET optical signal.

Optical Scanner: A scanner designed to read text and/or graphic information from a printed page.

Personal Communications System (PCS): Evolution of the telecom system from location-oriented architecture to subscriber-oriented architecture, such as cellular.

Pixel: The individual dots on a computer screen. A picture cell. The smallest addressable dot on a CRT (cathode ray tube) or VDT (video display terminal). Letter, numbers, and symbols consist of pixels arranged in a matrix.

R-BOCS: Regional Bell Operating Companies. The segments of the old, broken up Bell Telephone System. Major players in technology development and competition for broadband multimedia service provider opportunities.

Scanner: An optical input device which recognizes a specific group of visual symbols and translates the visual signals into digital signals.

Seamless: The "invisible" joining of separate elements, similar to "transparent."

Serial Transmission: A means of data transmission in which all the bits are sent a bit at a time over a single wire. All bits are transmitted serially rather than simultaneously. Contrast with "parallel transmission."

SONET: Synchronous Optical Network. A new and growing body of standards that defines all aspects of transporting and managing digital traffic over fiber optic facilities in the public network.

Star Topology: A network topology in which all the nodes are connected by a separate and independent wire to a central hub, which is usually the network server.

STM: Synchronous Transfer Mode. A transport and switching method that depends on information occurring in regular and fixed patterns with respect to a reference such as a frame pattern.

Strand-Miles: Measurement of fiber-optic cable deployment. Each cable contains 20 strands of fiber. This system provides an accurate comparison with copper phone lines.

Synchronous: A method of operation in which processing begins in response to internal events or to a clock-generated signal. Contrast with asynchronous.

Synchronous Transmission: A technique to data transmission in which data is transmitted at a fixed rate, and both the sending and receiving devices use the same clocking signals to synchronize transmission rates. Contrast with "asynchronous transmission."

System: All of the equipment, personnel, material, procedures, documentation, and information which forms a self-sufficient unit capable of attaining specified objectives.

Telecommunications: Currently, a means of communication in which computers use telephone systems to transmit and receive information.

Telepresence: "Attendance" by multimedia communication at a remote site.

Twisted Copper Pair: (P.O.T.S) The existing "Plain Old Telephone System" built on a base of copper wire.

UNI: User-Network Interface. The physical and electrical demarcation point between the user and the public network service provider.

Video-on-Demand: Video programing that provides what you want, when you want it, anywhere in the loop with VCR-like control.

Video Dial Tone: Full-time, switched, interactive, equal-access video communications. Similar conceptually to telephonic dial tone, only in a broadband architecture.

Virtual Personal Computing: Use of a switched communications link to separate the human interface of a PC from the processor so that a variety of processing units can be accessed remotely. Apple's "knowledge navigator" is an example.

Wan: Wide Area Network. A group of local area networks which are joined together and share the same overall protocols to enable sharing of information of peripherals.

Wideband: A channel width greater in bandwidth than a voice grade (300Hz to 3000Hz) channel. Normally associated with circuitry or cabling which can transmit video, audio, and digital signals.