Abstract

THE IMPACT OF EMERGING TECHNOLOGY TO LAW ENFORCEMENT TRAFFIC SERVICES

by

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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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INTRODUCTION

What is the possible future of traffic management? One answer lies in technology either in existence or now in development. Commuters of the year 1992 can only imagine an endless parking lot, a highway that stretches out before them clogged with other cars moving a snail's pace. This is what the public, and probably many law enforcement personnel as well, envisage.

There are, however, alternate images for other people who seek to find the promise of the future. Some of these images are still confined to the imagination of traffic specialists, some are dreams, some are in the development stages, and some are starting to surface and can be seen in today's commuting environment. These possibilities are only limited by money, research and creativity.

Imagine an ordinary commuter leaving his or her home. The driver starts the car and is greeted by the car's own personal traffic management voice. A brief weather report, an analysis of traffic congestion, suggested alternate routes to the destination are all provided immediately. The car leaves the driveway, stops to pick up two neighbors for car pooling, and heads for the nearest major street.

As the car enters the street the on-board traffic management system suggests the most expedient route to the work site. It

informs the driver to turn left at the next corner to avoid traffic congestion and talks the driver through the entire trip.

The driver notices during the drive that he has only stopped for one stop light all week. The satellite program that controls the signal timing senses the correct setting for the signals and also controls the speed of the vehicle during the commuter rush. The system even keeps the vehicle in position relative to surrounding vehicles. It automatically accelerates and decelerates to maintain a constant distance between vehicles.

If the commute is of longer duration, the driver may direct the vehicle to one of the many Maglev-rail ports, carried to the destination via clean magnetic power.[1] The Maglev system uses magnetic power to carry and propel commuters along elevated track system similar to the antiquated Monorail of Disneyland fame.

This traffic future is bright and it can be part of a brighter future courtesy of creative traffic management programs.

As was suggested in the first paragraph, the word TRAFFIC conjures up an image of tightly packed vehicles moving at a snails pace. Overheated vehicles with their similarly overheated drivers disgusted with their plight moving on antiquated roadways. According to the original California dream, everyone could own and drive a car. No one ever said how fast or efficiently.

In reality, as the imaginary scenario described above indicates, the word traffic refers to something quite different. It refers to the science of regulating the movement of cars and trucks either down a highway or on surface streets.[2] The subject of this study is the examination of the future of traffic management as it is affected by existing and emerging technology and as it affects one individual community. The county of Orange is used as an example of a major entity in this regard, and the City of Huntington Beach will be used as an example of an affected community.

Generally speaking, there was little change in traffic patterns, and hence traffic control methods, until well after World War II.[3] Subsequent to that era, there was an enormous influx of new residents into Southern California; an influx that at first was confined to major population centers such as Los Angeles. In 1940 the Los Angeles area contained a population of 2,785,643. Twenty years later, in 1960, that population had increased 216% to 6,038,771.[4] Later, however, particularly as freeways became more available, new residents began to move farther and farther from business and industrial centers, and traffic control problems began to increase. Orange County's population then increased 101% from 1960 to 1970.[5] In addition, there has been a significant migration of residents from some Los Angeles County areas relocating to Orange County that has further complicated matters for traffic engineers. The jobs remain in Los Angeles

County, but the homes were now in Orange County. This population increase has begun to affect the so-called "Inland Empire" to the east of Orange County, and it is predictable that the traffic problems that have affected Orange County over the past twenty years will begin to affect Riverside, San Bernardino and San Diego Counties as well.

Additional evidence of the increase in traffic in Orange County can be found in vehicle registrations. The County vehicle registrations are expected to increase another 11.4% by 1996.[6]

This expansion of population, along with the fact that population must move an extensive distance twice daily has dimmed the California dream considerably. A typical resident of Los Angles County now spends 30 hours a week in congested traffic, or 1,560 hours every year. Traffic jams are the norm. A swiftly-flowing freeway is unusual. It is obvious to traffic engineers, law enforcement and the public that strides must be taken in the future to lessen the congestion and the emissions-generation problems caused by this type of traffic congestion. The individual's romance with the car has to be brought under control. Techniques to move traffic in a rapid and efficient manner need to be developed.

The management of the traffic problem is, legitimately, a futures issue. The problem existed 10 to 15 years ago, was difficult to

deal with then, and has gotten progressively worse.[7] Unless something is done, traffic volume will become unmanageable in the future. It has been said by many that one day in the foreseeable future there will be a gridlock jam on a major freeway so bad that the only solution will be to pour cement over the cars and begin all over. The story is imaginary, but it makes a point.

At the same time, existing and emerging technology may provide solutions to these problems. Local law enforcement traffic specialists, however, will have to make preparation for those solutions lest they render themselves obsolete, surrendering control to California Department of Transportation (CALTRANS). Both the environment and the technology are changing in such a rapid manner that what is discovered today is antiquated tomorrow. Manufacturers are often tooling up to produce a product that is already obsolete. Particularly is this true in the computer business. Research and development is always a year or more in advance of manufactory because of the necessary tool-up time to produce product.

Those in the law enforcement community are also victims of these circumstances. Technology in traffic services is also advancing at an ever-accelerating rate. For example, the future for the vehicle operator may well involve "Smart Cars for Smart Highways".[8] These were conceived by Isaac Azimov more than 20 years ago, and the technology exists today, though not yet in a useable

form. This, however, will not provide a solution to all traffic control problems, and may never. Some additional future programs are outlined below.

One promising program is vision enhancement, which utilizes ultraviolet (UV) light. Normal high beams are effective out to ranges of 1000 feet, but, because they can blind drivers they should not be used in heavy traffic. Low beam headlights, however, extend to about 500 feet. Ultraviolet lights would be invisible to oncoming traffic and would be used with low-beam headlights to improve visibility at the 500-foot range. When UV light, operating at shorter wave lengths (100-400 nm, nm=nano meter or 1 billionth of a meter) than ordinary visible light, strikes a fluorescent material, it triggers a physical process that makes the material luminous.[9]

The use of UV lighting would require special fluorescent coatings to be applied on signs, roads, bridge pillars and other vehicles in order for them to be visible. Pedestrians would also benefit since many ordinary fabrics, such as the denim used in jeans, are very visible in UV light.[10]

Another development is the "Autonomous Intelligent Cruise Control," now under development in Germany.[11] It uses a hood-mounted, five-ray infrared (IR) sensor system. Distance and speed between the lead and following vehicle are determined by measur-

ing the time it takes for the IR signals to be emitted, strike the lead vehicle and return to the sensor's receiver. The computer sends commands to actuators that move the accelerator, throttle valve and brakes. Commands are also sent to the automatic speed controller and the automatic transmission. The sensors monitor from a minimum distance of 16 feet to a maximum distance of 500 feet. Using this system, the driver sets the desired speed, as in using a standard cruise control, and the car in front will be followed at the legal distance computed from the speed setting.

A system promoted by BMW is called COMPANION.[12] It performs both emergency call and emergency warning systems providing automatic notification of accidents. The heart of this system involves special roadside posts that, while looking like standard posts, have transmitter/receivers in the base with only the antenna projecting above ground. The posts are also fitted with red and yellow flashing lights.

Cars and trucks would be equipped with an electronic unit that could communicate with the receivers/transmitters in the posts. The posts themselves would be linked together and to a central emergency control center via buried cable.

Under normal circumstances, when a vehicle is traveling at a steady speed, the system is quiescent; if an accident occurs, the

vehicle speed is dramatically decreased, the system is activated. When this happens, an emergency message would automatically be transmitted to the nearby posts. The crash is sensed by an accelerometer similar to the ones used to trigger the release of air bags. The emergency center would know immediately of the accident and its location. The flashing lights on the adjacent posts would then be activated to warn other drivers.

Another example of traffic control is an experimental motorist information system. This system is designed to show personnel in a specific work area the most efficient ways to leave that area, whether on work assignments or commuting. The system uses computer terminals that are posted at the access points to the parking lots. These computer terminals are continuously updated from source points in the field. Thus, all information on construction, accidents, disabled vehicles, lane blockages, and traffic condition in the monitored area are relayed to the computer terminals located at the exits from the work areas. These are CRT screens that individuals can inspect before getting into their vehicles. The system even includes a weather report.[13]

Access to information is the key to efficient trip-planning. Accurate information is what allows drivers to avoid congestion and thus move towards their destinations in a reasonable manner. Changeable Message Signs (CMS)[14] will be a primary source of that information. These are somewhat similar to signs now

available on a few Southern California freeways, though the system would be more sophisticated. Information is provided in "real time", that is as it happens, about lane closures and congestion on the highway. It will provide alternate route suggestions giving motorists data upon which to base decisions. Ideally, they will be placed on local connections between surface streets and freeway on ramps in advance of all freeway-to-freeway interchanges to allow a viable alternative route to the crossing freeway.

Another informational aid is the Highway Advisory Radio (HAR).[15] HAR is used to provide motorist with information which is too detailed or lengthy for a CMS system. It is used to advise motorists of construction activities, traffic diversions, road conditions affecting health and safety, advisories of special event congestion, and alternate route recommendations. HAR can be used for real time information. Again, a similar system, Traffic Radio, 530 AM is available on a limited basis on a few Southern California freeways.

The purpose of this paper is to examine, on a concrete level, the future traffic control problems and emerging technology with Orange County as an example of a county adjacent to a major metropolitan area such as Los Angeles City, as well as the traffic control problems of a community such as Huntington Beach within that county. In essence, the matter to be addressed is what

traffic specialists in that city can do to update their knowledge regarding existing and emerging technology, and what, politically, can be done to enable them to participate in planning engaged in by state and county traffic control agencies.

Conclusion

In summary, it appears to be safe to state that many of the problems now bedeviling automobile and truck drivers as well as police departments can be solved by traffic systems either under development or available at the present time. This leaves the serious question of how these systems will alter current methods of handling traffic at the local level. This last issue is the subject of this paper.

It is recognized by this writer that many forms of traffic technology are not applicable to neighborhood streets. The concern of this paper is the arterial streets that boundary those neighborhood areas, the streets that most people use to commute to their workplaces, recreational areas and or shopping centers.

The material in the paper that follows refers to a number of technological developments whose names are not yet in common usage. To provide clear understanding of the traffic technology terms used in this paper, the following Glossary of Terms is provided:

GLOSSARY OF TERMS

1. **Autonomous Intelligent Cruise Control.** A five-ray infrared-sensor is mounted in the hood of the following vehicle. It bounces the rays off the vehicle immediately ahead. It controls speed and following distances of equipped vehicles.

2. **Changeable Message Signs (CMS).** Computer generated programmable signs similar to bill boards. The signs relay traffic information from traffic operations centers by displaying the message on the signs adjacent to the highways.

3. **"Companion".** European-developed road post emergency warning system. Transmitters on posts along highways monitor the flow of traffic. Accident location can be determined by speed reduction on the highways. The posts are also equipped with red and amber warning lights to advise traffic that is approaching an accident location. The system has the capability of transmitting messages to and from equipped vehicles.

4. **Gridlock.** The point at which traffic can no longer move on the highways.

5. **Highway Advisory Radio.** A radio system, 530 AM, that provides traffic conditions, information, warnings of accidents

or construction areas. The system can suggest alternate routes in advance of congested areas. The system is usually recorded but can be in "real time" announcements.

6. **Loop detectors.** Electrical detection device that consists of imbedded wires in the roadway to monitor traffic flow. The system can detect speed and volume of traffic on the highways. Allows the traffic operation center computer to determine if the traffic flow and speed is consistent with "normal" operations in specific areas.

7. **Mag-rail.** Commuter transportation system that uses electrical magnetic power, a clean fuel source, as its propellant. The magnetic power is delivered to the transporting vehicle via a monorail type system. The vehicle is similar to the Disneyland Monorail in the amusement park.

8. **Motorist Information System (MIS).** A network of terminals located at the exits of high density worker locations. The screens allow personnel to check the traffic conditions, weather, and suggested alternate routes during the work day and for the homeward commute.

9. **Real time.** The time the incident is occurring, the presence, now.

10. **Smart Cars.** Vehicle with on board computer systems that warn the operator of adverse highway conditions. System could include weather, alternate routes, or news bulletins.

11. **Smart Highways.** Highways with monitoring devices to determine and control traffic flow. The devices control speed, identify accidents and promote vehicle traffic flow.

12. **Traffic.** Traffic includes pedestrians, ridden animals, vehicles, street cars, and other conveyances, either singularly or together.

13. **Traffic Bureau.** Traffic Bureau refers to a bureau with in a police department structure. This bureau is orientated towards enforcement of traffic laws in the community.

14. **Traffic Engineer.** Traffic engineer is a position generally with in a public works department. This position applies itself to the technical aspects of traffic management.

15. **Traffic Management.** The organization, direction and implementation of methods or technology to precipitate the orderly flow of traffic.

16. **Vision Enhancement.** Swedish system that uses ultraviolet light to illuminate objects out to 500 feet. Ultraviolet

light cannot be seen by oncoming cars and does not blind them as normal highbeams could. Ultraviolet light could illuminate signs made with fluorescent coatings or clothing made of fluorescent materials.

FUTURES STUDY

PHASE I

The issue question is the following:

> **"What will be the future impact of emerging technology to law enforcement traffic services in a mid-size community by the year 1998 ?"**

The intent of this research is to evaluate the trends and events emerging in 1992 that will impact traffic services over the time period ending in 1998. The future time line of six years is appropriate since technology develops at such a rapid rate that the change that would take place farther out is very difficult to forecast. New and unforeseen technology renders such forecasting susceptible to inaccuracy. Use will be made of futures forecasting techniques to help generate scenarios that may help to prepare for possibilities that await the law enforcement community.

As this study is about technology rather than policy, change may be expected to take place, or at least the technology available to create change may emerge, much faster than changes in those attitudes and beliefs that created existing policy and that must be changed if that policy is to be changed. Technological change arises from laboratories, from programs like those in the Transportation Institute at the University of California Berkeley and University of California, Irvine. These are essentially "think

tanks" where traffic experts develop ideal traffic models that are based on both traffic studies and emerging traffic management technology.

Screening of Potential Sub-issues using a Futures Wheel

A Futures Wheel was used to determine the relevant sub-issues effecting the issue question. A panel of four law enforcement managers was used to identify the three most important sub-issues relating to the Issue question. This process involved assembling a group of four law enforcement managers and the writer to screen potential sub-issues, and select those that appeared to be most important. The primary issue was presented, and the managers were then asked to brainstorm in order to identify sub-issues that were components of the main issue.

The panel members were:

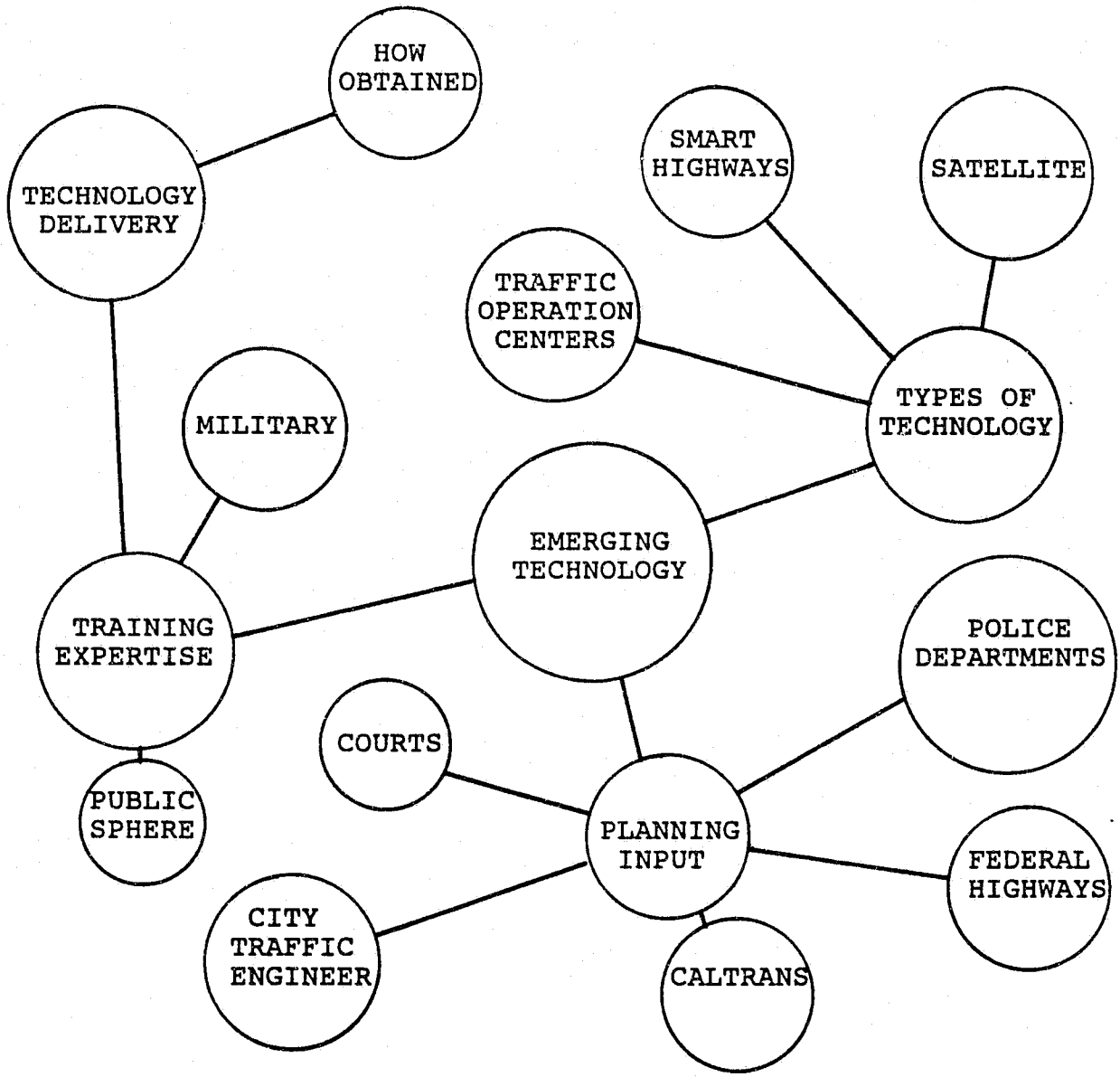
1. Lieutenant Samuel Spiegel, Corona Police Department.
2. Lieutenant Jeffrey Roop, Fullerton Police Department.
3. Lietenant Norman Hurst, San Bernardino Sheriff's Department.
4. Captain Dave Bellomy, San Bernardino Sheriff's Department.

The Futures Wheel, shown in Figure 1, is a means of visually illustrating the results of the above process, and the relationships to the primary issue.

Those sub-issues are;

1. **What form will the delivery of emerging technology take?**
2. **How will law enforcement acquire expertise in handling technology?**
3. **How can law enforcement increase its input into the planning phase for the delivery of emerging technology?**

Figure #1-Futures Wheel



As is seen in Figure 1, the central issue of emerging technology is related directly to training and expertise, planning input and types of technology. Each of these three sub-issues has related issues that they influence, or that influence them. This last category, however are outside the scope of this study. Thus, the

matters to be addressed include (1) emerging technology and components (2) types of technology, (3) planning input and (4) training expertise.

PHASE II

IDENTIFICATION OF TRENDS AND EVENTS:

To assist in developing trends and events relevant to the issues, a group was assembled to participate in a **NOMINAL GROUP TECHNIQUE (NGT) process.** The group consisted of seven people knowledgeable in traffic related fields, not all law enforcement personnel. The group was composed of the following seven participants.

1. Captain Dave Helsel. A California Highway Patrol administrative officer.
2. Mr. Bruce Gilmer. A municipal public works traffic engineer.
3. Lieutenant Patrick Gildea. A police manager from a mid-size department
4. Mr. Dean Delgotto. A manager from the Orange County Transportation Authority.
5. Sergeant William C. Stuart. A supervisor from a mid-size police department traffic unit.
6. Mr. Ignachio Ochoa. A manager from an environmental management agency.

7. Sergeant Lloyd Edwards. A manager from a mid-size police department traffic unit.

The meeting began with an explanation of the NGT process. A statement of the issue and sub-issues upon which the group was to focus was displayed. The **NGT** process was explained to the group. The panel was asked "What trends are likely to be related to the issue/sub-issues I have presented to you?" To start ideas flowing trend examples were presented.

The panel's individual trends were gathered using a "round robin" format. The trends were placed on a flip chart and displayed so all members could see them. The trends were discussed in order to generate a clear understanding of their meaning. The panel produced forty trends. Group discussion resulted in the combining of several of the trends that had previously been stated separately.

TRENDS

1. Advance in satellite communications technology.
2. Bar code technology.
3. Video camera unit systems.
4. Signal pre-emption system.
5. Smart highways.
6. Decriminalization of traffic violations.

7. Smart Cars.

8. Alternate fuel sources.

9. Electric powered vehicles.

10. Satellite traffic control.

11. Alternate funding for highways.

12. Advanced transport information systems.

13. Traffic operation centers.

14. Media coverage in real time.

15. Real time signal operations.

16. Alternate methods of transportation.

17. Bike facility development.

18. Increasing fuel supply costs.

19. Insurance Company funding of technology.

20. Passive restraint systems.

21. Adjusted work week modification.

22. Mandated car pooling.

23. AQMD vehicle use restrictions.

24. Jail constructions.

25. Court room backlogging.

26. High cost of vehicles.

27. Regional traffic enforcement.

28. Dynamic development of technology.

29. Civilianization of law enforcement operations.

30. Consolidation of city services.

31. Federal environmental guidelines.

32. Amount of mandated safety laws.

33. Establishment of hi-tech training unit.
34. Courts inability to keep up with new laws.
35. Amount of funding for law enforcement budgets.
36. Post funding reimbursements.
37. Amount of public support for new technology.
38. Social attitudes towards substance abuse.
39. Cost/availability of education.
40. Enforcement technology development.

SELECTION OF TRENDS FOR FORECASTING

The panel members were then asked to individually rank the top twelve trends according to their perception of how the trends could influence the issue question. Their ranking were then transferred to a voting system, thus identifying which trends were valued highest by the group. The panel than used the same process to identify and rank 37 events that would impact the issues and sub-issues questions.

The rating scale used by the panel were Priceless, Very Helpful, Helpful, Not Very Helpful and Worthless.

TABLE #1-TREND SCREENING FORM

For purposes of top-level strategic planning how valuable would it be to have a really long range forecast of the trend?

CANDIDATE TREND	price less		very helpful		helpful		not helpful		worth less
Level of air quality management districts restriction on traffic flow.	2		4		1				
Number of traffic operations centers.	1		4		2				
Amount of public support for new technology.	3		4						
Amount of law enforcement. funds available for traffic technology.	3		4						
Level of research, internal/ external, committed to traffic technology development.	2		4						
High cost of vehicles.					3		4		
Cost of education.			1		3		1		3
Amount of alternate funding traffic technology develop.	1		1		4				1
Courts ability to keep up with new laws.					2		3		2
Number of advanced transport information systems.			1		4		1		1
Amount of fuel supplies.					1		5		1
Number of vehicle mandated traffic safety laws.							3		4

The consensus was that the top five trends were the most valuable to forecast. The following trends were identified:

TREND # 1 **LEVEL OF RESEARCH, INTERNAL AND EXTERNAL, COMMITTED TO TRAFFIC TECHNOLOGY DEVELOPMENT.**

Internal research refers to activity by the individual community; external refers to that engaged in by an external agency such as Orange County Traffic Engineer.

The group felt initially there may be a slow down or cut back on research and development due to the reduction in the availability of military research and development that is applicable to traffic engineering

TREND # 2 **AMOUNT OF PUBLIC SUPPORT FOR NEW TECHNOLOGY.**

The group felt that in order for technology to be developed the public would need to provide support. Evidence of this would be the willingness of the public to support by taxes and pressure on other public entities the development of new technology. Funding must be available to make any public program viable.

TREND # 3 **AMOUNT OF LAW ENFORCEMENT FUNDS AVAILABLE FOR TRAFFIC TECHNOLOGY.**

The group felt that future law enforcement budgets would be an indicator of which way the overall support for technological developments in traffic related service would go.

TREND # 4 **NUMBER OF TRAFFIC OPERATION CENTERS.**

Due to the ever-increasing volume of traffic, the panel felt that there would be a major change in the development of traffic operations technology. The focus of the group was on more sophisticated units that operated on a regional basis. The systems would make use of more than a hardwired system, i.e. satellite control of smart freeway systems.

TREND # 5 **LEVEL OF AIR QUALITY MANAGEMENT DISTRICTS (AQMD) RESTRICTION ON TRAFFIC FLOW.**

This was as defined as regulating the vehicle traffic on the highways in an attempt to reduce smog levels in the Los Angeles and Orange County basins.

SELECTION OF EVENTS FOR FORECASTING:

The panel was then asked the question "What events would have an impact upon the issue (and sub-issues) presented to you, should each event occur?" The emphasis was on policy relevance to the identified issues, sub-issues. The panel identified thirty-seven events.

EVENTS

1. Major Civil Disorder.
2. Unplanned disaster.
3. Passage of a law enforcement sales tax.
4. Mandated balanced budget.
5. Stock market hits 4000.
6. State cuts all revenue sharing for law enforcement services.
7. Electronic jail development.
8. Election of new political position for traffic management.
9. Tax status change for individual/corporations.
10. Federal Judge orders increase of speed limit on Federal highways to 70 mph.
11. Municipalities reduce budgets 25%.

12. Sworn personnel for field use only.
13. Tax base reduction passed by legislature.
14. Mass production of electric vehicles.
15. Major environmental research discovery.
16. Driving under the influence a felony in California.
17. Defense spending cut 30%.
18. Low cost personal 911 device developed.
19. New federal highway bill.
20. Political reform act.
21. Court restricts vehicle traffic to 50% of present flow to enforce AQMD standards.
22. Unemployment rate hits 15%.
23. Development of safe apprehension tranquilizer gun.
24. Sales tax increase hits 15% more than previous year.
25. No growth/slow growth measure county wide.
26. Law passed decriminalizes traffic violations.
27. Police officer associations demand proficiency pay for new technology use.
28. State budget deficit causes major reduction in all government programs.
29. Hispanic population hits 50% in county.
30. Opening of major recreation center.
31. Private highways opened in county.
32. Legislature guarantees money for health care.
33. State beaches require reservations.
34. Vehicle use restrictions implemented.

35. $.50 per gallon fuel tax.

36. Carpool lanes on city streets.

37. Fuel availability reduced by 50%.

The panel was then asked to identify the five most probable events. The following events were identified.

EVENT # 1 **MAJOR CIVIL DISORDER.**

Major civil disorder refers to generally unplanned for riot-type activities that demand expenditure of funds. The Los Angeles Riot of 1992 is an excellent example. The group felt that there was potential for other riots to occur, which would affect the level of funding for technological development.

EVENT # 2 **PASSAGE OF A LAW ENFORCEMENT SALES TAX.**

The group felt that, due to budgetary difficulties, it was possible in the foreseeable future that a separate tax could be levied in order to support the law enforcement community. This would free funds for both research and development and required training in new technology.

EVENT # 3 **STATE CUTS ALL REVENUE SHARING FOR LAW ENFORCEMENT SERVICES.**

The state collects taxes and then returns portions to the cities. The group felt that it was possible for

cuts at the state level that would certainly affect law enforcement services such as Peace Officer Standards and Training (POST) funds or funds supporting local court operations.

EVENT # 4 **COURT RESTRICTS VEHICLE TRAFFIC TO 50% OF PRESENT FLOW TO ENFORCE AQMD STANDARDS.**

The group felt that restriction of private vehicle use would eventually become unavoidable. Crowding and general road conditions would make it necessary to restrict the volume of traffic into heavily congested metropolitan areas. Commuter-efficient systems would have to be developed to solve the problems that this would produce.

EVENT # 5 **STATE BUDGET DEFICIT CAUSES MAJOR REDUCTION IN ALL GOVERNMENT PROGRAMS.**

The group felt that there was an over-extension of programs in California, and that funding would be cut. This could mean programs such as Caltrans, Highway Patrol and other highway traffic management programs would be cut.

PHASE III

TREND FORECASTING:

The group was asked to estimate the level of the five trends and to forecast their level estimate in 1989, 1995 and 1998. The value of trends at their current level in the year 1992 was set at 100. Thus, using 100 as the present value, the panel projected their estimates of change in terms of direction (up or down) from the level existing today. A normative or desired futures' forecast was also developed for each trend.

The trend data collected from the group was then placed in a Trend Evaluation Table. The purpose of the trend evaluation table was to develop the median nominal trend level (will be); the upper quartile; the lower quartile and the median normative (should be) trend levels as determined by the group. They were then determined, plotted and graphed.

The level of each trend in 1989 was less than in 1992. The medians for the next three years indicated that the levels of all the trends would all be higher than 1992 levels. The six year medians were even higher. The normative medians generally indicated that the trends were at or within 50 points of the "should be" levels. The exception was "The Amount of Support for New Technology". The difference was 60 at three years and 125 at six years. This indicated the perception of the group that what will

be occurring will fall dramatically short of what should be occurring. This information is displayed in Table #2.

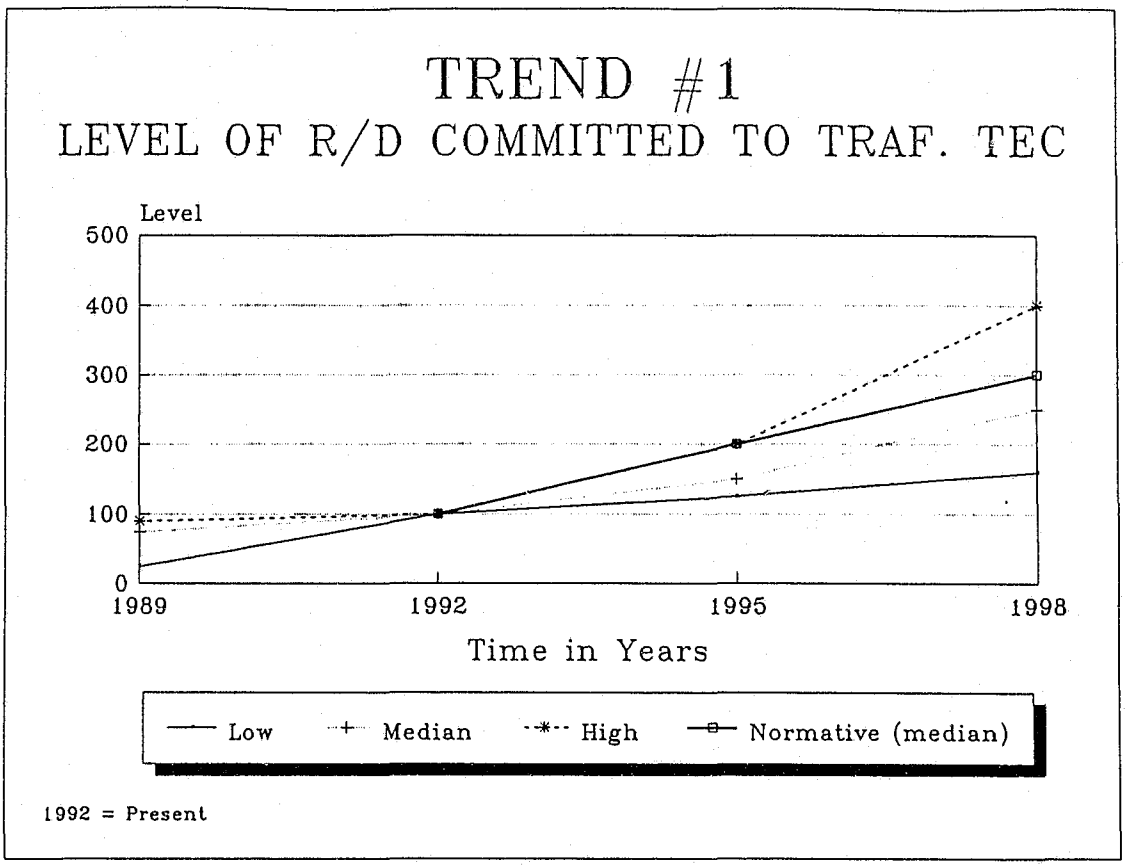
TABLE #2-Trend Evaluation Table

Panel Median Forecasts----- N=7

	TREND STATEMENT	LEVEL OF THE TREND (Today = 100)			
		3 Yrs. Ago	Today 1992	3 Years From Now	6 Years From Now
1	LEVEL OF R/D COMMITTED TO TRAFFIC TECHNOLOGY	75	100	150 / 200	250 / 300
2	AMOUNT OF PUBLIC SUPPORT FOR NEW TECHNOLOGY	90	100	140 / 200	175 / 300
3	AMOUNT OF L.E.FUNDS AVAIL FOR TRAFFIC TECHNOLOGY	90	100	110 / 150	130 / 200
4	NUMBER OF TRAFFIC OPERATIONS CENTERS	15	100	150 / 200	220 / 300
5	LEVEL OF AQMD RESTRICTION ON TRAFFIC FLOW	0	100	150 / 150	200 / 200

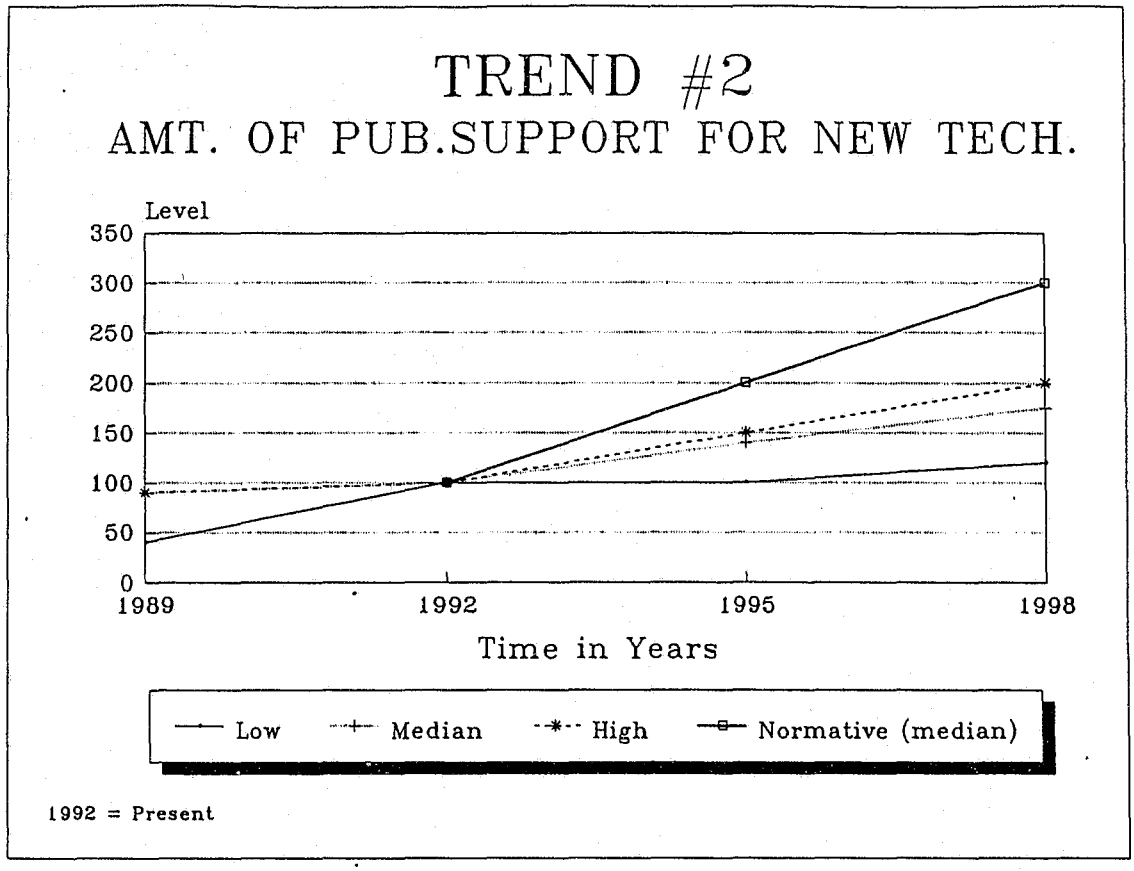
WILL BE / SHOULD BE

The following graphs of Trends One through Five show the group's forecasting in greater detail. The graphs depict the panel's estimates for each trend including the nominal high, low and median and the normative median as forecasted by the group.



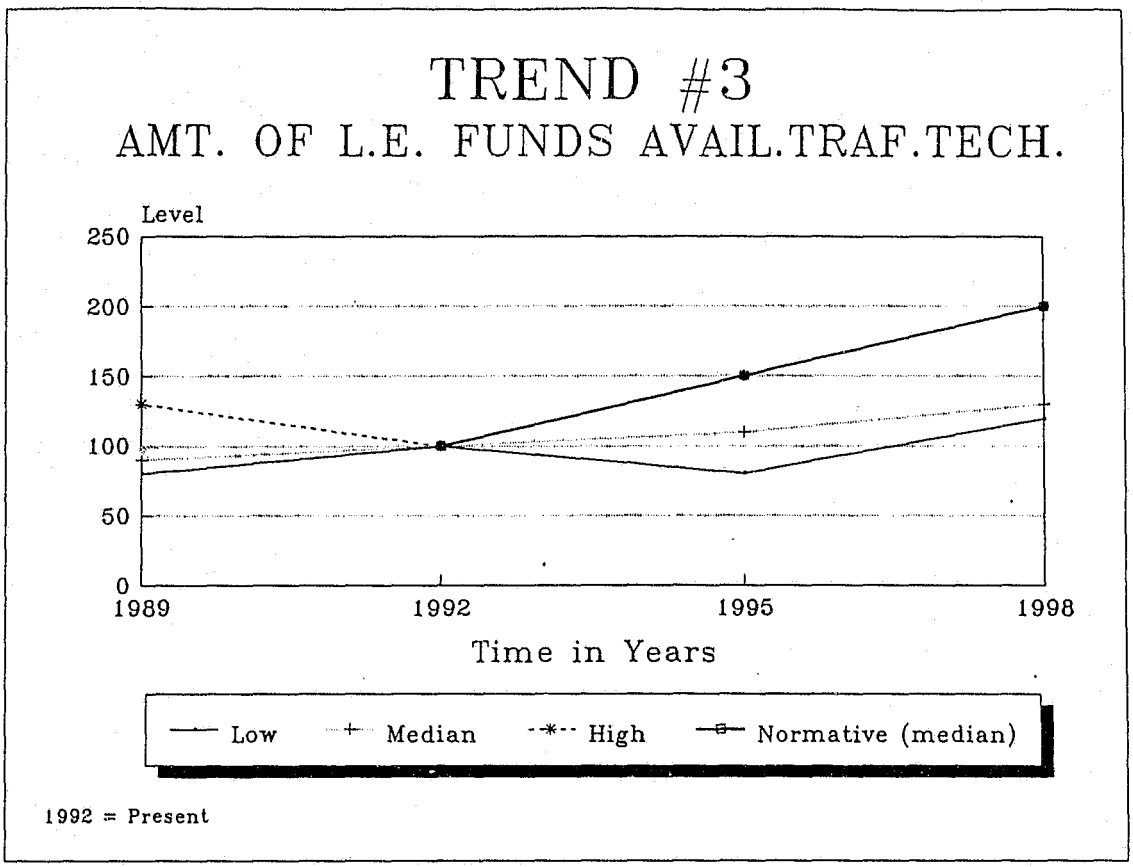
TREND # 1-LEVEL OF RESEARCH, INTERNAL AND EXTERNAL, COMMITTED TO TRAFFIC TECHNOLOGY DEVELOPMENT

The panel felt that from 1989 until the present there had been little development in the area of law enforcement technology. They did forecast that there would be a 50 point increase over the 1992 level through 1995. The increase from 1995 through 1998 would double that of the past three years, a dramatic increase in technology.



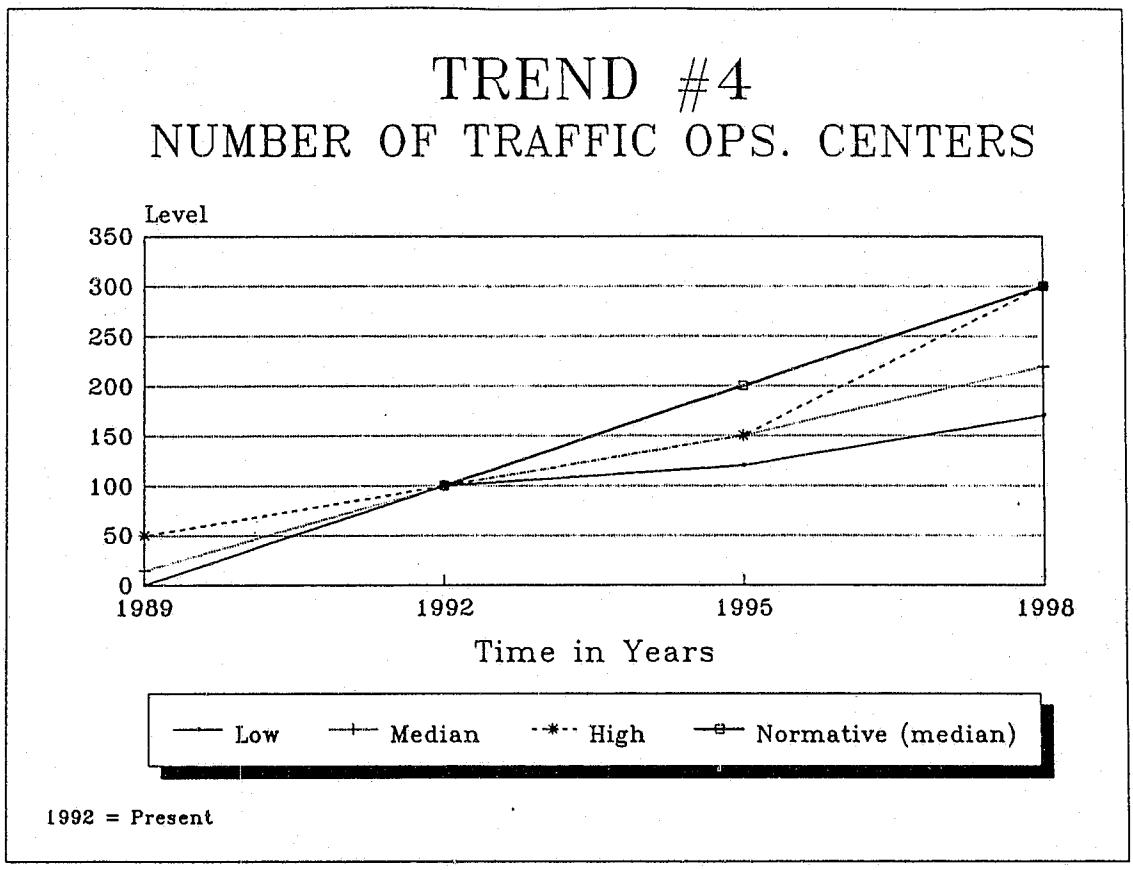
TREND # 2-AMOUNT OF PUBLIC SUPPORT FOR NEW TECHNOLOGY

The panel felt that there would be a steady increase in the public's support for the development of new technology in the area of traffic services. Their belief was due in part to the serious increase in vehicular traffic expected in the near future and likely to be consistent through 1998. In this graph the upper quartile and nominal median are the same from 1989 - 1992.



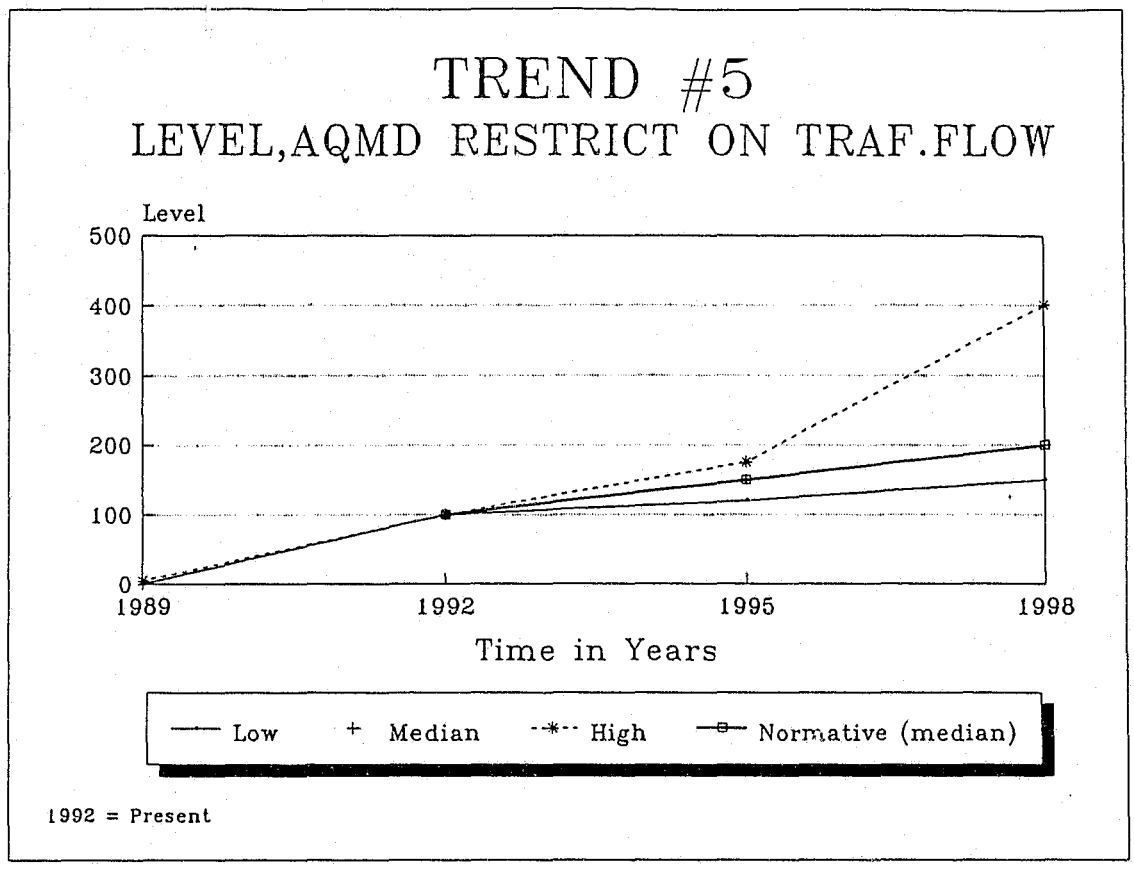
TREND # 3-AMOUNT OF LAW ENFORCEMENT FUNDS AVAILABLE FOR TRAFFIC TECHNOLOGY

The panel believed there would be very slow growth for law enforcement budgets during the period addressed in this study. An estimated 30 point increase from the amount in 1992 over the next six years. In this graph the upper quartile and the normative median are the same from 1995 through 1998.



TREND # 4-NUMBER OF TRAFFIC OPERATIONS CENTERS

The panel was aware that, in the past three years, a small number of rudimentary traffic operation centers have been introduced. These, however, only monitor traffic, rather than managing its flow. For the purposes of this forecast, the panel did not consider the fact that these units have only limited function. They felt that there would be a steady increase from the present through 1998 and beyond in the development of these centers. The extent of the increase would be more than twice the present level by 1998.



TREND # 5-LEVEL OF AIR QUALITY MANAGEMENT DISTRICTS (AQMD) RESTRICTION ON TRAFFIC FLOW.

The panel felt there had been nothing in the way of serious travel restrictions in the past three years. They did forecast a 50 point increase in the next three years, increasing to 100 points by 1998 the probability of increase as compared to today. In this graph the lower quartile and the nominal median are the same from 1992 through 1998.

PHASE IV

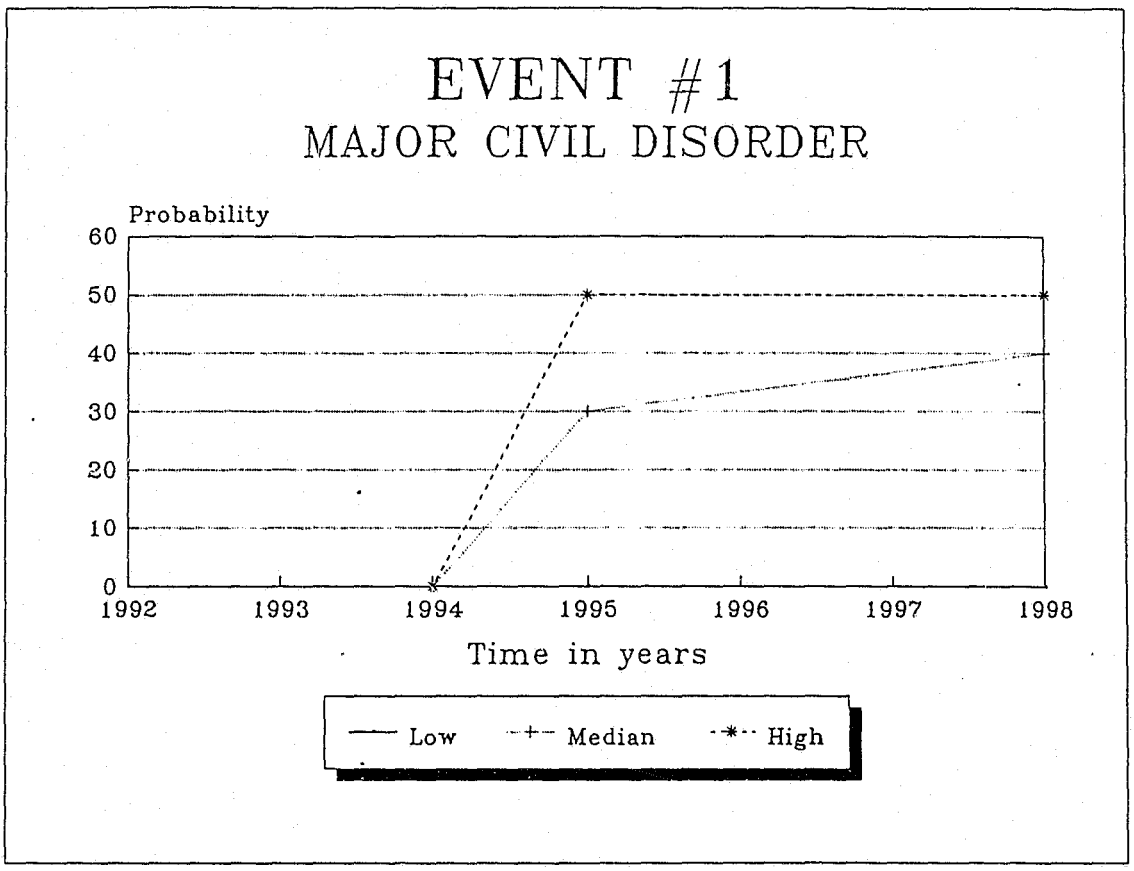
EVENT FORECASTING:

The panel was now asked to forecast the probability of occurrence of the top five events that had been identified earlier. The information was then placed into an Event Evaluation Table, Table 3, for consideration. The purpose was to forecast events based upon the years until the probability first exceeds zero, then three years from 1992, and six years from 1992. The evaluation was recorded as a percentage scale of zero to 100. The 0 indicates that the event will probably not happen. The 100 indicates that the event will probably occur within that time frame. There was also a positive and negative rating scale for each event. This scale was to determine the positive or negative effect on the Issue Question if the event occurred. Refer to Table #3, which displays the median forecasts.

TABLE # 3-Event Evaluation Table Panel Median Forecast, N=7

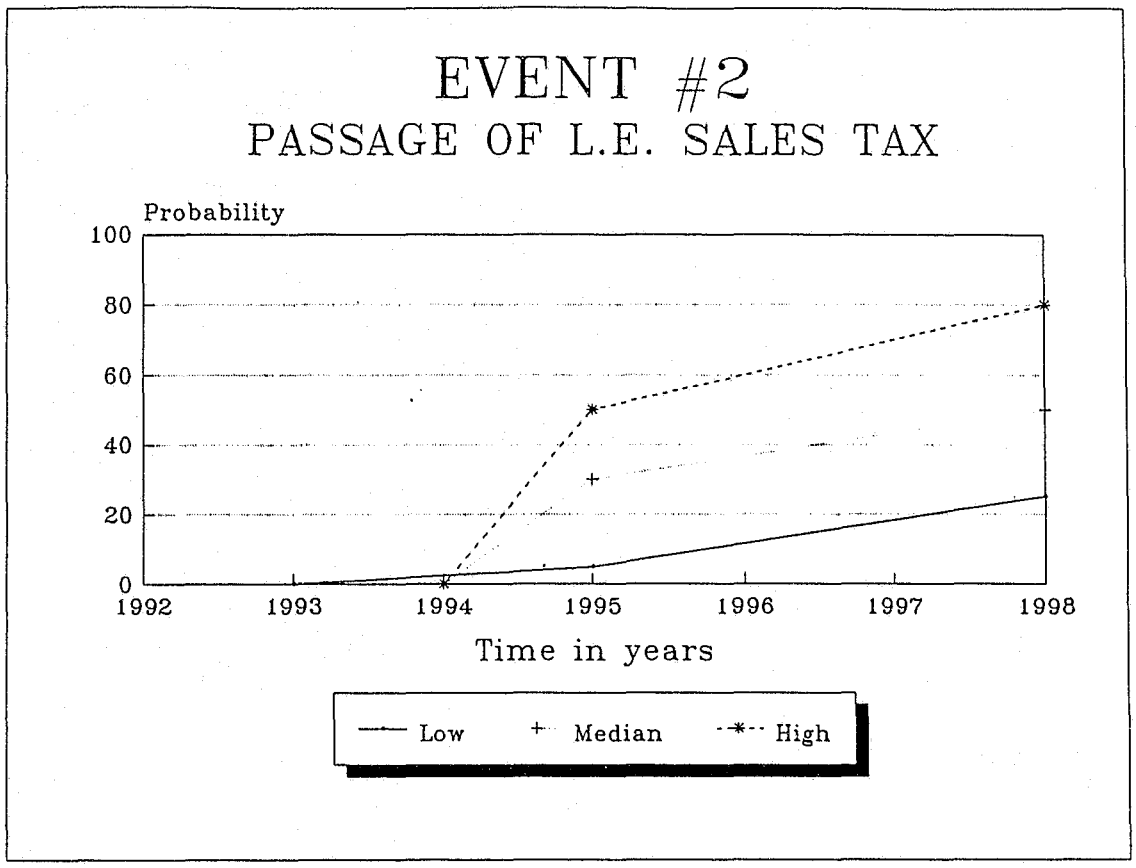
	EVENT STATEMENT	YRS.UNTIL PROBABILITY FIRST EXCEED ZERO	PROBABILITY		IMPACT ON ISSUE +/	
			3 YRS FROM NOW	6 YR FROM NOW	POS 1-10	NEG 1-10
1	MAJOR CIVIL DISORDER	2	30%	40%	2	10
2	PASSAGE OF L.E. SALES TAX	2	30%	50%	10	0
3	ST. CUTS REVENUE SHARING FOR L.E.	2	50%	80%	5	5
4	CT.RESTRICTS VEH.S TO 50% TRAF. FLOW	2	50%	80%	4	6
5	ST. DEFICIT,MAJOR REDUCT ALL PROG.	2	40%	40%	0	10

The events were then interpreted using those median indicators as follows:



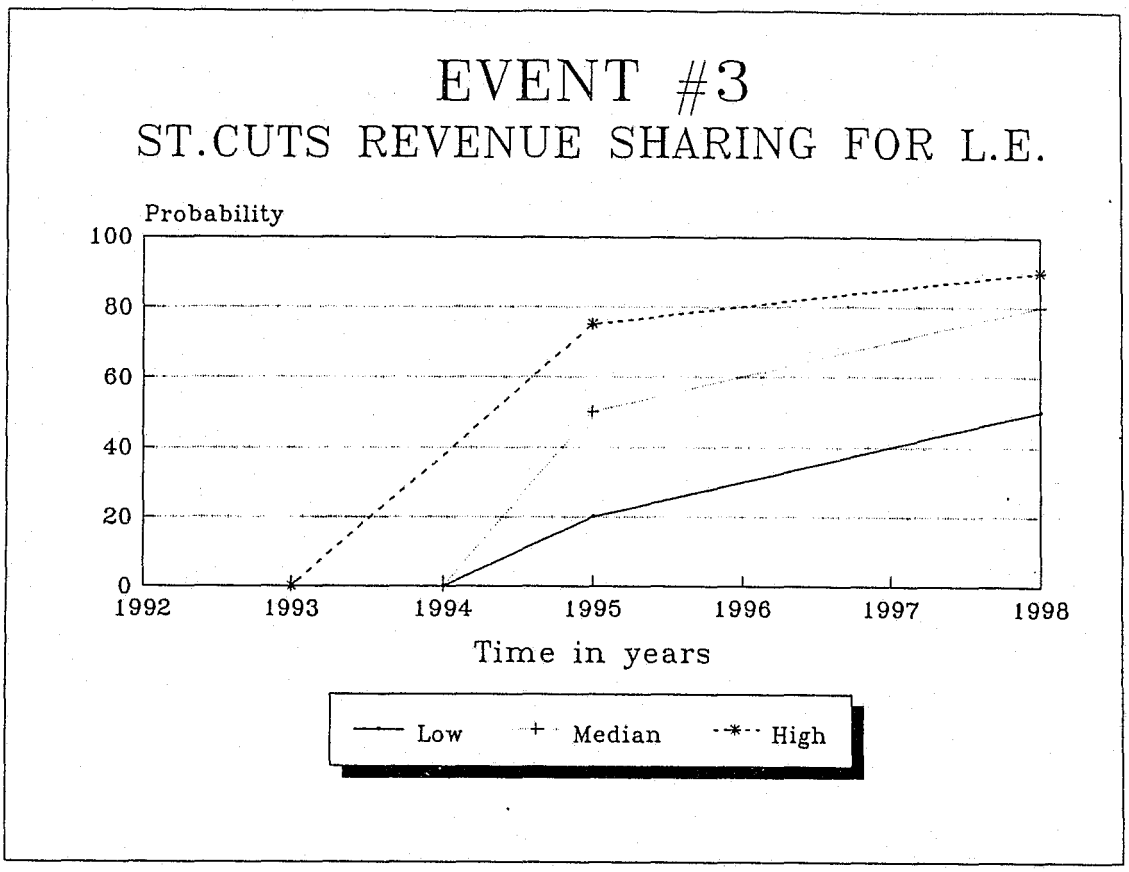
EVENT # 1-MAJOR CIVIL DISORDER.

The panel felt that the event would first exceed zero probability in 1994, increasing to a 30% probability until 1995, where it would start to level off, not exceeding a 40% probability. The leveling would be a result of the City and State programs adjusting to handle this particular threat. The increase would be approximately one third over the next three years. The low forecast on the event was opined to never exceed zero.



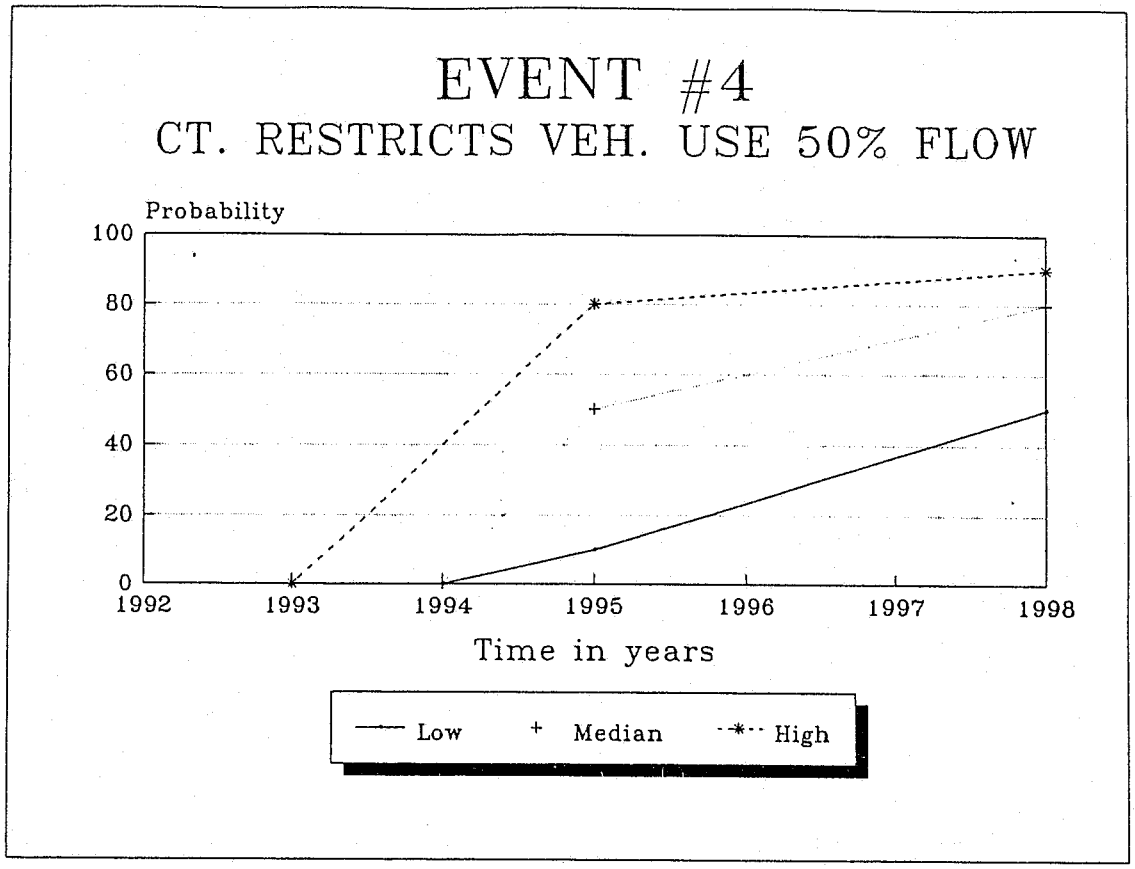
EVENT # 2-PASSAGE OF LAW ENFORCEMENT SALES TAX.

The panel saw this event exceeding zero probability by 1994. There was a rapid increase in the probability of such a tax until 1995, at which time the potential for the implementation of a tax slowed. The panel saw it as steadily increasing, but with less than one-third of the prior gain from this point to 1998.



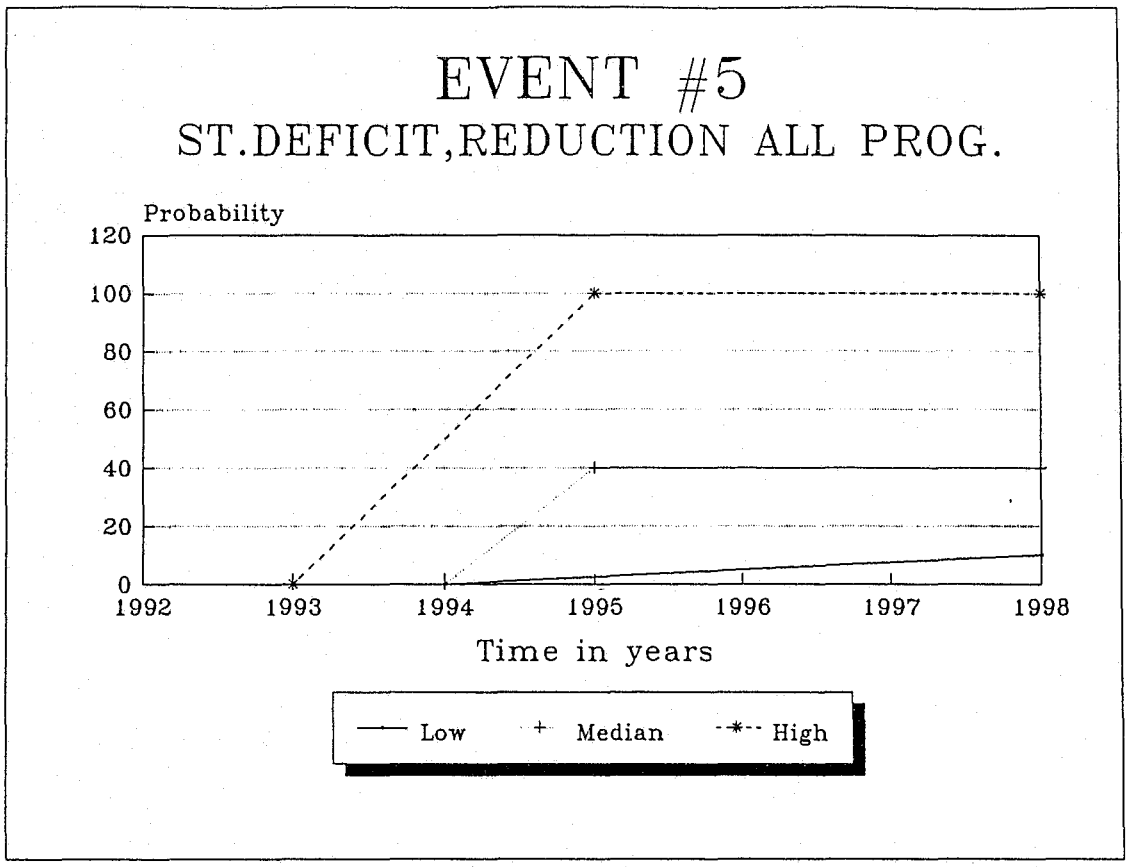
EVENT # 3-STATE CUTS ALL REVENUE SHARING FOR LAW ENFORCEMENT SERVICES.

The state starts cutting revenue sharing amounts in 1994. This reduction in sharing continues sharply until 1995. It than slowed, but steadily increased through 1998. The increase from 1994 to 1995 was twice that experienced from 1995 through 1998. The panel felt that there would be a severe impact on law enforcement budgets reducing the possibility of obtaining new technology and developing the expertise to implement it.



EVENT # 4-COURT RESTRICTS VEHICLE TRAFFIC TO 50% OF PRESENT FLOW TO ENFORCE AQMD STANDARDS

The panel felt that the first true vehicle use restrictions would surface by 1994. They expected an initial dramatic increase to 50 with a leveling out to 80 over the next three years. The panel felt that the increase in vehicles on the highways would result in litigation to reduce the damage to the environment. The expectation was that this initial dramatic increase would continue another 30 points and then level as alternate forms of transportation became rooted in the community.



EVENT # 5-STATE BUDGET DEFICIT CAUSES MAJOR REDUCTION IN ALL GOVERNMENT PROGRAMS

As with Event # 4, the year 1994 was again the year for this event to exceed zero probability. The panel estimated an increase of 40% by 1995 at which time it would steady, continuing at the same level over the next three years. It was the opinion of the panel that after the initial cuts in programs the state would level out in terms of spending. This did mean that law enforcement would suffer an increase in program responsibility at the same time that municipal budgets would also be shrinking, a definite revenue impact.

PHASE V

CROSS IMPACT ANALYSIS:

Using the forecast data provided by the panel, a Cross Impact evaluation was prepared. Analysis of this data was performed by two law enforcement managers, Lieutenants John Foster and Patrick Gildea of the Huntington Beach Police Department, and the writer. The percentage of change (increase or decrease) was estimated from the original forecast, should each event occur. They also estimated the years until the maximum impact of each event was reached.

TABLE # 4-Cross Impact Evaluation Panel Medians:N=3

THE MAXIMUM IMPACT (% change = -)
The Years to Maximum

											Impact Totals
E1	X	25/1.5	-5/1	0	-5/1	0	0	75/1	-25/1	0	5
E2	0	X	5/1	0	50/1	50/1	30/.1	90/1	0	0	5
E3	0	10/1	X	0	0	0	20/5	-25/1	-20/1	0	4
E4	0	0	0	X	0	0	0	0	25/1	90/2	2
E5	50/1	-50/1	0	0	X	70/5	-60/1	-50/1	-50/1	0	6
	E1 1	E2 3	E3 2	E4 0	E5 2	T1 2	T2 3	T3 4	T4 4	T5 1	

IMPACTED TOTALS

LEGEND

E1. MAJOR CIVIL DISORDER
E2. PASSAGE OF A LAW ENFORCEMENT SALES TAX
E3. STATE CUTS REVENUE SHARING FOR ALL LAW ENFORCEMENT SERVICES
E4. COURT RESTRICTS VEHICLE TRAFFIC TO 50% OF PRESENT FLOW TO ENFORCE AQMD STANDARDS
E5. STATE BUDGET DEFICIT CAUSES MAJOR REDUCTION IN ALL GOVERNMENT PROGRAMS

T1. LEVEL OF RESEARCH, INTERNAL AND EXTERNAL, COMMITTED TO TRAFFIC TECHNOLOGY.
T2. AMOUNT OF PUBLIC SUPPORT FOR NEW TECHNOLOGY.
T3. AMOUNT OF L.E. FUNDS AVAILABLE FOR TRAFFIC TECHNOLOGY
T4. NUMBER OF TRAFFIC OPERATION CENTERS
T5. LEVEL OF AQMD RESTRICTIONS ON TRAFFIC FLOW

Impact of Events on Both Events and Trends

Event # 1, Major Civil Disorder, impacted the following events and trends as indicated:

Event # 1 impacted Event # 2, Law Enforcement Sales Tax making providing a 75% probability that a tax would be implemented in 1.5 years after the disorder occurs. The disorder was predicted to occur after 1994, meaning that the tax would occur approximately July 1995.

Event # 1 impacted Event # 3, State Cuts Revenue Sharing for Law Enforcement Services, making it a negative 5% probability of occurring in one year. This equates to a 45% probability of occurrence in 3 years, 1995, and a 75% probability in six years, 1998. The expense of dealing with the disorder may further reduce the possibility of law enforcement receiving revenue sharing funds.

Event # 1 impacted Event # 5, State Budget Deficit Causes Major Reduction in All Programs. This provided a negative 5% probability that civil disorder in 1994 would contribute to further budget shortfall in 1995. This projects to a maximum impact of negative 5% in 1 year which results in 35% probability of occurrence by 1995 through 1998.

Event # 1 would impact Trend # 3, Amount of Law Enforcement Funds Available for Traffic Technology, a maximum of 75% probability in one year. Civil Disorder promotes insecurity on the part of the community. If Event # 1 occurs in 1994, by 1995 citizen support for law enforcement technology should increase dramatically.

Event # 1 would impact Trend # 4, Number of Traffic Operation Centers, Technology, in a negative manner. Law enforcement budgets are already being reduced across the board. Civil disorder would further have a 25% probability of a negative effect on law enforcement budget the first year due to the expense of combating the disorder.

Event # 2, Passage of a Law Enforcement Sales Tax, impacted the following events and trends as indicated:

Event # 2 impacted Event # 3, State Cuts Revenue Sharing for Law Enforcement Programs in a positive manner. The sales tax would relieve part of the burden of costs for law enforcement from coming out of city general funds. It was felt by the group that this had a 55% probability of occurring by 1995, increasing to an 85% probability by 1998.

Event # 2 impacted Event # 5, State Budget Deficit Causes Major Reduction in All Government Programs. The passage of

the tax would provide a direct financial source for law enforcement services. It was felt by the panel that the probability would be a positive 90% by 1995 continuing at that level through 1998.

Event # 2 would impact Trend # 1, Level of Research, Internal and External, Committed to Traffic Technology Development, a positive 50% the first year. The probability of a tax would certainly allow funding for research and development in law enforcement areas.

Event # 2 would impact Trend # 2, Amount of Public Support for New Technology, a positive 30%. The passing of such a tax would indicate growing support for the Law Enforcement Community. The panel felt that there would be a positive 30% increase almost immediately since this would allow further increased development of technology from a non-budget source.

Event # 2 would impact Trend # 3, Amount of Law Enforcement Funds Available for Traffic Technology, a positive 90% the first year. That assumes that the percentage of income is sufficient to supplement and expand the budget, when compared to prior budgets.

Event # 3, State Cuts All Revenue Sharing for Law Enforcement Services, impacted the following Events and trends as indicated:

Event # 3 would impact Event # 2, Passage of a Law Enforcement Sales Tax. There would be a 40% positive probability of the passage of a law enforcement sales tax if event #3 occurs. This would increase to a 60% positive probability by 1998. The panel felt that the public would support a sales tax under these circumstances.

Event # 3 would impact Trend # 2, Amount of Public Support for New Technology. There would be a positive 20% probability of public support developing over 5 years due to the lack of revenue available from the State.

Event # 3 would impact Trend # 3, Amount of Law Enforcement Funds Available for Traffic Technology, there would be a negative 25% probability on the law enforcement budget the first year as lack of revenue sharing is felt.

Event # 3 would impact Trend # 4, Number of Traffic Operation Centers. It was estimated by the group that reduction of revenue would effect the research and development a negative 20% during the first year due to program cuts.

Event # 4, Court Restricts Vehicle Traffic to 50% of Present Flow to Enforce AQMD Standards, impacted the following events and trends.

Event # 4 would impact on Trend # 4, Number of Traffic Operation Centers. There would be a maximum 25% increase in probability of traffic operations centers in one year. The centers would be needed for co-ordination and monitoring of the court ordered traffic reduction.

Event # 4 would impact Trend # 5, Level of AQMD Restriction on Traffic Flow, if there were vehicle movement restrictions applied to reduce traffic flow, there is a 90% probability the Court support action would strengthen the effect of any restrictions made by the AQMD. This would be effective in 2 years.

Event # 5, State Budget Deficit Causes Major Reduction in All Government Programs, impacted the following events and Trends as indicated:

Event # 5 would impact Event # 1, Major Civil Disorder. There would be a 80% increase in the probability of Civil disorder by 1995 increasing to 90% probability by 1998. Budget program cuts usually means dissatisfaction by the

public. Program cuts in welfare or other economic support programs would fan the flame of civil disorder.

Event # 5 would impact Event # 2, Passage of a Law Enforcement Sales Tax. There would be a negative 50% possibility that a law enforcement sales tax could be established during the first year. The probability by 1995 would be a negative 20% and a negative 10% by 1998. If law enforcement programs were eliminated and the public felt threaten there would be an increase in the possibility of a law enforcement tax.

Event # 5 would impact Trend # 1, Level of Research, Internal and External, committed to Traffic Technology Development. There would be a negative 70% probability the public supporting technology development reaching maximum in 2 years. Lack of budget money means a lack of programs.

Event # 5 would impact Trend # 2, Amount of Public Support for New Technology. There would be a negative 60% probability of the public supporting new technology maximizing in the first year due to program cuts.

Event # 5 would impact Trend # 3, Amount of Law Enforcement Funds Available for Traffic Technology. There would be a negative 50% probability of obtaining funds the first year.

Event # 5 would impact Trend # 4, Number of Traffic Operations Centers. There is a negative 50% probability of the establishment of traffic control centers in one year. Research and development money would be restricted.

Actor Events

Actor events are those that have a major impact on either trends or events if they do in fact take place. The major Actor Event was Event # 5 with a total of six trend/ event contacts.

PHASE VI

SCENARIOS

The final phase of this section is dedicated to the development of possible futures. These futures are based upon the previous study of potential future trends and events. These imaginative stories are designed to provide planners and policy makers with a limited view of what the future may hold.

The city of Huntington Beach, California is used in these scenarios as a model for a city of its type in Southern California. Other cities similar to it, and therefore possible sites for these scenarios would be other beach cities on the Southern California coast. There will be three modes of forecasting present-

ed: The Exploratory (Nominal); the Normative; and the Hypothetical.

The City of Huntington Beach evolved from a small sleepy beach resort in the early 1900's to a major community of 190,000 by the 1990's. The majority population of the city is White, though the demographics of the city have been changing and the city is becoming more ethnically and culturally diverse.

The city covers 27 square miles, including seven linear miles of popular recreational coastline. During the summer months, Huntington Beach becomes the destination for thousands who are intent upon escaping from the inland heat as the sun scorches those areas not adjacent to the ocean. There are three State Highways that traverse the city and are used by people seeking the beach.

State Highway 1 follows the coast route through the city and is a primary beach access pathway. The second is State Highway 39. This is a direct access route from the inland to the coastline, where it dead ends into State Highway 1. The third is the 405 Freeway. This is a loop connector route which bifurcates from the 5 Freeway in north Los Angles County and then loops west around the city of Los Angles, reconnecting with 5 Freeway in Orange County south of Huntington Beach. It acts as a conduit to bring the throngs of Los Angles to the beach to escape the summer heat.

During the summer months, the department experiences policing and traffic problems common to most resort communities as visitors from other Southern California communities flock to the beach for a day in the sun. The population of the city can double on any given summer day.

The department is headed by a chief of police who serves at the pleasure of the city council and who reports to the city administrator. The department is organized into four separate divisions: (1) administration, (2) investigation, (3) uniform, and (4) services. The government structure is council/administrator.

Common to most law enforcement agencies, the Huntington Beach Traffic Section is designed to control and move the daily commuter traffic in and out of the city. The seasonal influx is managed by a system that was never designed for a task of dealing with the proportions of summer traffic. At the time the original streets were laid out, the planners only envisaged Huntington Beach as a retirement beach community served to a great extent by the "Red Car" system that was run by the Pacific Electric Railway.

SCENARIO #1

Exploratory (Nominal Mode)-- "Surprise-Free"

Huntington Beach News Post, July 6, 1998

It has happened again. It happened last year, and it happened the year before. The Fourth of July Committee scheduled a parade, a surfing contest and the usual fireworks display all on the same day. And what has been the result? Pacific Coast Highway was blocked with cars for hours; the usual traffic jam on Highway 39 extended to the city limit and beyond; the freeway off ramps of the 405 were jammed with vehicles, creating problems on that freeway as potential beachgoers baked in the sun on overcrowded highways. In short, July 4 was a disaster once again.

This newspaper has learned that many of the traffic problems of the 4th of July weekend could have been mitigated. The city fathers have not attempted to obtain and implement technology designed to facilitate traffic flow. Many of the problems could have been ameliorated by the type of warnings such as commuters receive on their way to work on many Southern California freeways in Los Angeles County.

This may, of course, have arisen from the cut in state funding arising from continued state budget deficits (E - 5), that have reduced revenue-sharing for law enforcement (E - 3). The failure

of the state population to pass a sales tax to help fund law enforcement (E - 2) has only made this situation worse.

This reporter, with a minimum of investigation and no knowledge of traffic management, has discovered a number of techniques to improve traffic flow that have been developed recently (T - 1). Changeable Message Signs (CMS) along the roadways could have warned of traffic jams, accidents and potential alternate routes. An accident alerting system called "COMPANION" could have rerouted traffic and assisted emergency vehicles in responding and locating accidents. Highway Advisory Radio could have warned drivers of congestion and specific problems miles before they were caught in the jam.

This failure is the more important since public support has nearly doubled in the last five years. A comparison of an opinion poll taken in 1993 by this newspaper with the one taken this year indicates that a substantial change has taken place in the public's attitude (T - 2).

An additional problem is the AQMD actions recently with respect to traffic flow. The AQMD has gradually applied more regulations on the individual driver in traffic over the past five years (T - 5).

The City should have been participating with the state and county as they developed the Traffic Operation Center for the region (T - 4). Smart Corridors, Super Streets, and High Occupancy vehicle facilities would have assisted the orderly movement to and from the beach to say nothing of everyday commuter traffic.

Our police should be able to handle the traffic. Haven't they learned anything from the growth in previous years? This seasonal deluge of beachgoers is nothing new. Why haven't they availed themselves of the new technology in traffic management? Why aren't they participating in the decision-making processes that determines the movement of traffic through our community?

Who failed to plan and participate in the Regional Traffic Management Plan? Why aren't these systems, and others not mentioned here, in place or being planned in an effort to reduce the horrendous parade of overheated people and vehicles that occur every summer?

Where are our road taxes going? What is the city doing to improve our lot? What are the police doing? This reporter wants to know!

SCENARIO #2

Normative Mode--"Desired and Attainable"

Huntington Beach News Post, July 6, 1998

It has happened again, but the problem appears to be less than it was last year. The Fourth of July Committee scheduled a parade, a surfing contest and the usual fireworks display. What has been the result? Well, there is still heavy traffic, but it seems to be moving more efficiently. Given the fact that the AQMD has been threatening to restrict traffic flow under conditions that cause hundreds of cars to sit idle, pumping exhaust emissions into the air (T - 5) means that this is an important accomplishment. In addition this renders moot the recent decision by the State Supreme Court to reduce traffic flow by 50% (E - 4).

It is apparent to this reporter that someone has finally taken note of the horrendous traffic conditions in this city during the summer and especially on the 4th of July. Last year was major parking lot city. This year the traffic seemed to be moving, even if it was at a snail's pace.

It would appear that the passing of the 1995 initiative (Proposition 12) on the state ballot to institute a law enforcement sales tax (E - 2) has provided the necessary funds to promote new traffic technology. This has also solved the problem raised by the

reduction in traffic management programs arising from the continuing state deficit (E - 3). The earmarking of these funds for law enforcement purposes has managed to offset the State's major budget deficit of the same year which caused a reduction in almost all government programs.

It is this newspaper's opinion that there is definite trend towards the increase in traffic management technology (T - 1). It has become especially obvious since 1992 when that field of research escalated dramatically after the passage of Proposition 14 that provided state bonds to fund traffic technology development for law enforcement (T - 3). The fact that this passed with 75% "Yes" votes that the public was very supportive of this solution (T - 2). Some of the technology now in use was in the development stages at that time. It is obvious that those trends and events have improved the traffic management of our highways.

This newspaper would like to provide modified praise for the Huntington Beach Police Department for making use of the Changeable Message Signs. These signs along the highways have provided early direction and warnings. This has allowed many travelers the opportunity to take alternate routes to the beach. It has also reduced the volume of traffic on roadways with accidents or other traffic flow restrictions. The Highway Advisory Radio has also helped drivers. By tuning in to 530 AM on their radio dial they have received information to avoid potential traffic jams

and delays. The loop detectors placed in the roadway have also improved the flow of traffic on Highway 39. There is very little traffic backing up the off-ramps and into the 405 Freeway .

Improvement is still needed. Incident detection equipment, Smart Streets, and Super Streets would really help to relieve some of the congestion. Even more important is the city's participation in the county traffic operations center (T - 4) and the county traffic management plan. The traffic operation center, established in 1992, controls the flow of traffic on a majority of the state and county roadways. In this reporter's opinion the participation of police traffic personnel is a must.

This newspaper has learned that the county is planning to enlarge its Traffic Operations Center. The purpose of the center is to facilitate the flow of traffic county wide. This means a coordinated application of the most advanced traffic technology. It has also been learned that the City of Huntington Beach has no representative to this program from the police department. It is obvious that traffic engineers design systems, but it is just as obvious that those concerned with the physical operations on the street also have input into the systems. Our police representatives should sit in on the development committees in order to contribute that practical "street know how" so important to the development of any efficient traffic system. How can the city

improve traffic flow without representation on the premier programs in the area?

We believe it would be wise for the Department to investigate this technology to determine whether, next year, it will be possible to have a July 4 celebration that is, truly an "Independence Day" in that it is independent of traffic congestion.

It will also be necessary for the formation of some kind of county-wide task force whose job it is to coordinate the introduction of new techniques into traffic management. If this is not done, then county or state authorities will impose technology and regulations on local agencies that the latter will find difficult to deal with

SCENARIO #3

Hypothetical Mode--"What If...."

Huntington Beach News Post, July 6, 1998

It has happened again, but the problem appears very much under control this year. The Fourth of July Committee scheduled a parade, a surfing contest and the usual fireworks display. And what has been the result? Thanks to the proactive stance taken in the past three years by the Huntington Beach Police Department there was the usual heavy traffic bound for Huntington Beach at

all hours of the day, yet traffic moved smoothly, if more slowly than normal, and there were less than the usual number of traffic accidents. This is likely to prevent threatened restrictions by the AQMD on traffic flow (T - 5) and render unnecessary the projected case requesting the courts to restrict vehicle (E - 4)

The Police Department deserves a vote of thanks from the community for introducing a comprehensive Traffic Operations System. The police traffic unit, with the support of the City Council and community organizations such as the Chamber of Commerce, was able to participate with the State and County representatives to develop a fully functional regional traffic management plan. The county realized that, if municipal traffic was not coordinated with their plans, any improvements they made would be negated as soon as they interfaced with local streets.

Even in the face of drastic local budget cuts arising from reductions in revenue sharing (E - 3), and State program cancellations arising from the continuing state deficit (E - 5), the public rallied to support traffic management technology. As a result of the passage of the law enforcement sale tax in 1995 (E - 2), the County Traffic Operations Center was funded (T - 4) to include local municipal participation. The result has been the implementation of the latest in technology for the movement of vehicle traffic through out the county (T - 2).

One of the first additions was the completion of the changeable message signs to include municipal roadways. It gave the driver an immediate jump on traffic conditions in the areas he intended to visit. This, with the fully coordinated signal and loop system, allowed the driver to be moved from one end of the county to the other in an orderly controlled manner. The loop system especially complemented the Smart Streets and Super Streets that were designed to move local traffic at slower speeds than freeways but with fewer stops as on the old local highway systems. The installation of the Closed Circuit Television System allowed law enforcement to instantly evaluate traffic and emergency conditions on the roadways. Responses to calls for assistance were faster, and congestion reduced. None of this would have been possible without the increased public support for new technology (T - 2) reflected in the 1992 and 1995 surveys conducted by this newspaper. This paved the way for the increase in law enforcement funds available for traffic technology (T - 3) made possible by the law enforcement sales task and increase the level of R/D committed to traffic technology (T - 1).

All of these developments in traffic management technology were a direct result of the support provided by the community that surfaced between 1992 and 1995.

The Police Department, working in conjunction with the City Traffic Engineer, was able to demonstrate to the City Council the

advantages of participating in joint programs with the state. This coordination allowed for the inclusion into the city program the newest in traffic technology. It also allowed the police department to express concerns on projects that were not sound from the local law enforcement or operations standpoint. Police contacts with the Chamber of Commerce resulted in Chamber support for technology development. Not only were the traffic conditions on the 4th of July improved due to the implementation of the new traffic technology, but it allowed consumers to visit our community businesses more easily. That, of course, translates into more business income which in the long run means more revenue to the city.

STRATEGIC PLAN

This portion of the paper outlines the structure of the strategic plan and how anticipations could bear on the future. The strategic management plan will be based on the hypothetical scenario, "What If...." This scenario paints an optimistic future for the City of Huntington Beach. The objective of this strategic management plan is to make that scenario a reality for purposes of this paper.

Mission Statement

Macro-Mission Statement

The City of Huntington Beach Police Department does not have a mission statement per se. Though it has a "Values Statement," the latter does not appear to fit as a basic mission statement for the department. Therefore, the Macro-Mission Statement for this study will be the following, which appears to be the fundamental, generic mission of almost any police agency.

> "Maintaining order, preventing crime, identifying and apprehending criminals and insuring the protection of life and property to society."

Micro-Mission

Conversely, the mission statement of a specific task within an organization is known as a "micro" mission statement. This statement was developed by the same group that assisted in the identification of the sub-issues of the study and the Futures Wheel discussed above. A "brainstorming" technique was used. The "micro" mission statement for this study is:

> To enable local law enforcement to both take advantage of traffic management technology that is either in existence or under development and to share in the regional planning for the use of such technology so as to maximally benefit the local community.

Objectives

In order to put the micro-mission stated above into operation, the following objectives must be met in the strategic planning and transition management phases of the projected future.

OBJECTIVE 1 -- Identify the opportunities and threats.

OBJECTIVE 2 -- Identify the assumptions that each of the stakeholders have.

OBJECTIVE 3 -- Identify stakeholders in providing traffic related services to a mid-size community.

OBJECTIVE 4-- Identify the organizational capability for change

OBJECTIVE 5 -- Develop alternative strategies to achieve the mission.

OBJECTIVE 6 -- Implement the plan of the selected strategies.

SITUATIONAL ANALYSIS

WOTS-UP ANALYSIS

The WOTS-UP process involves two different assessments: the first is the examination of the external environment factors that could impact on Huntington Beach Police Department's capability to deal with the strategic issue. Logically, the second is an assessment of the organizations internal environment. "Threats" and "opportunities" are external in the environment, while "strengths" and "weaknesses" are internal to the organization. A "weakness" is a fault, defect or limitation within an organization that may impede the attainment of objectives. An "opportunity" is any situation which is favorable to the proposal. A "threat" is any unfavorable situation. A "strength" is a resource or capability used to accomplish a goal.

For purposes of conducting the WOTS-UP analysis, three members of the Huntington Beach Police Department management staff were used as consultants in the decision-making process. One of the members was a Lieutenant, a former traffic bureau commander, the second was also a Lieutenant, the coordinator for the community-oriented policing program, and the third was the Assistant Traf-

fic Engineer for the City of Huntington Beach. The writer explained the contemplated future, the purpose and process of WOTS-UP analysis, and provided the panel with a few examples of each category in the analysis. They were further instructed to make use of the trends and events evaluated earlier in this paper in identifying the WOTS-UP analysis components. The panel then used brainstorming techniques in order to provide the following analysis

WOTS-UP ANALYSIS LIST

ENVIRONMENT

The "environment" is the external atmosphere in which the organization functions.

Opportunities

1. Use taxes for law enforcement services.

   The present economic environment has made it necessary for use taxes to be used to support programs favored by the public. Law enforcement could benefit from this same trend for selected programs.

2. Public support for new technology.

   The public is supportive of programs that will benefit their environment. Traffic problems is one of those issues that the public is constantly confronted with; it is likely that

the public would be supportive of programs that would ease their passage from home to work and elsewhere

3. Advances in computer technology.

Computer technology is an industrial area in which the pace of development of new techniques is accelerating every day. Continued update of traffic management techniques using this technology can provide solutions for traffic service management problems that exist today.

5. Regionalized traffic management.

Local traffic problems are frequently caused by traffic flow that is external to the local community. It is therefore important that local traffic managers be able to tap into resources that involve the management of traffic external to their community. This may involve consolidation of traffic management resources, which will involve more efficient use of budget funds.

6. Advanced transportation information systems.

These systems make it possible to make regionalized traffic management a workable concept. Without these systems, regionalized traffic management will not work.

7. Smart Highways.

This is an expansion of the Changeable Message Signs that are found on some of today's freeways. Smart highways involve sensors embedded in the highway that transmit messages to an on-vehicle computer providing information both about traffic congestion and possible alternate routes for the

vehicle driver to take. This system is currently being tested in the State of Connecticut.

8. Advancements in satellite technology.

   Satellite technology provides effective VHF and other radio technology that is not affected by interruptions in line-of-sight transmission caused by either buildings or land mass.

Threats

1. Sales Tax increase to balance budget.

   An increase in the sales tax required to balance the budget may reduce citizen willingness to support purchase and use of new technology.

2. Municipality budget reductions.

   For any city, the reduction of the budget means program reduction or elimination. Thus, any threat to the municipal budget may well involve a threat to the implementation of the projected traffic management plan.

3. Industry moves out of state.

   Closure of a local plant because the industry in question is moving out of the State of California will have a serious effect on local taxes and the local municipal budget.

4. Federal environmental guidelines.

   These guidelines are designed to govern various types of construction as they may affect the environment; it is possible that such guidelines might prevent the implementation of certain aspects of a regional traffic management plan.

5. Cost/Availability of education for police personnel

   This relates to the ability of individual law enforcement agencies to train their personnel in the technology to be introduced.

6. Seasonal population density.

   The city is a beach community whose population can double on any day, or treble on a weekend day, during the summer.

7. Inter-City departmental competition for resources.

   There has been spirited competition for funds and resources by other city departments which are jealous of the preeminence of funding for law enforcement.

Organizational Strengths and Weaknesses

The following analysis involves the strengths and weaknesses of the Huntington Beach Police Department to deal with the selected trends and events as played out in the hypothetical scenario. The analysis will involve an assessment of the strengths and weaknesses of this organization.

As was described earlier, the City of Huntington Beach is a mid-size community of a mixed residential and commercial makeup. It is also a recreational community with seven miles of sand beaches. The population is approximately 190,000 and primarily white. On any weekend during the summer the population can almost double with visitors intent on the sun and sand. The city has a area of 27 square miles. It is served by a 229 sworn officers with a support staff of approximately 150. The Chief is appointed and

serves at the decision of the City Administrator with approval of the seven person City Council.

The following analysis of the strengths and weaknesses of the department with respect to the issues and sub-issues was made with the assistance of a committee made up of five members of the Huntington Beach Police Department. The members of this committee consisted of Lieutenant Bruce Kelly, Lieutenant Gary Davis, Lieutenant Patrick Gildea, Lieutenant John Foster and this writer.

Strengths

Internal

1. Pro-active departmental attitude.

   The department has a long history of supporting and implementing new technology.

2. Relatively new and innovative chief.

   The chief of police is a young man and committed to exploring ways of improving the department and his service to the community.

3. Stable police budget.

   The public safety budget in the city has always been a priority budget item even in hard economic times.

4. Well-trained department.

   The department has always made generous use of POST training and reimbursement. They do not hesitate to send personnel

to any school that would benefit the officer and, thus, the community.

5. Rapid response capability.

   Existing support for helicopters, traffic units and communications equipment has resulted in a rapid-response condition in the community.

Weaknesses

Internal

1. Negative Competition

   As with any mid-sized department, there is negative competition over the advancement of personal agendas.

2. Resistance to changing departmental structure.

   The department is abandoning many of the traditional structure, such as centralization of decision making, in favor of more currently popular programs such as community policing. There is some resistance to this type of change on the part of some of the more traditionally-minded managers and street officers.

4. Lack of on-going training time.

   Whereas the department is willing to send officers to training, it is sometimes unwilling to maintain these officers on a "current" basis with update training.

5. Militant police officers' association resistant to change.

The police officer's association is controlled by a silent few who further their own agendas and are therefore often at odds with program proposals by management.

External Analysis

1. Council support.

   The city council has traditionally been very supportive of the police department, and is therefore likely to support traffic management plans.

2. Community support of public safety

   As would be expected from the support from the city council, the community is likely to support traffic management plans that will improve traffic flow in and around the city.

3. Computer friendly.

   The city has always supported technology that will take the entire city into the computer age, with the emphasis on the police and fire departments.

STAKEHOLDER ANALYSIS

This section of the study involves identification of those in the environment who have a "stake" in the outcome of the scenario. The selected technique is termed Strategic Assumption Surfacing Technique, and involves the assumptions that can be made about

the position of "stakeholders." These individuals can be persons, groups of persons or organizations who:

1. Have an impact on the plan.
2. Are impacted by the proposed changes.
3. Have concerns about the proposed changes.

Each of the stakeholders can have a positive impact, negative impact or both, relative to the issue. Each has a "stake" in the plan to manage the successful impact of emerging law enforcement technology being delivered to the community.

Included in the stakeholder identification were several "snaildarters". "Snaildarters", like the stakeholders, have a stake in the issue/plan, though this is frequently not immediately obvious. Most often, they provide a surprise to program managers because their interest is not immediately obvious. They have the potential to either assist in the process or stop or hinder the organization and can even cause critical problems for program or plan implementation.

The same group that was used for the WOTS-UP analysis were used in the developing of the list of stakeholders and their attitudes toward the proposed plans.

Stakeholders

The following is a list of the stakeholders identified by the panel described above.

The City Council.

Public transportation officials.

CALTRANS.

Police Dept.

Public Works Department.

Chamber of commerce.

Traffic engineering.

AQMD (Snaildarter).

General public.

Taxpayer watchdog group (Snaildarter).

News media.

Environmental Protection Agency (Snaildarter).

Once the stakeholders and the snaildarters are identified, their positions on the issues were analyzed. This analysis included the making of assumptions as to the position of each stakeholder in relation to the research issue. Once these assumptions were made a Stakeholder Assumption Map was prepared. This Assumption Map depicts the importance of the stakeholders and snaildarters as they relate to the research issue, and the level of projected certainty of the assumptions attributed to each stakeholder.

The AQMD role of Snaildarter is based upon its concern for environmental issues. It is anticipated that for most traffic man-

agement programs there would be no conflict. If any thing the AQMD would be supportive of the majority of programs.

The taxpayer watchdog group needs to be convinced of the advantages of traffic management programs. The programs need to be economically sound and cost efficient. It is important that good communications be established when developing policy. Their primary concern is fiscal responsibility.

Assumptions

1. The City Council.
    a. The city will be concerned about costs related to services, about service to the community and about revenue generation.
    b. The city will be concerned that selected programs receive public acceptance especially considering potential revenue requirements.
    c. The city will also be concerned about the implementation of traffic management programs that may affect and interact with neighboring cities.
2. Public Transportation Officials.
    a. Will be concerned with restrictions on routes. Traffic management techniques may require modification of routes to serve the community.

b. Will be concerned about operational cost increases that new technology might generate for new equipment

c. Will be concerned about the methods to procure changing technology.

3. CALTRANS

a. Cost of technology to implement new traffic management techniques.

b. The control of traffic volume on state routes.

c. The state budget to fund the implementation and development of new traffic management technology.

4. Police Department.

a. Cost of technology

b. Sufficiency of state budget for implementation of technology and training of personnel.

5. Public Works.

a. Costs of technology.

b. Will there be potential state revenue to support programs.

c. Sufficiency of city budget for the training necessary to implement technology.

6. Chamber of Commerce.

a. Effect on revenue to city businesses.

b. Fear that new technology and traffic management systems will require additional local taxation.

7. Traffic Engineering.

   a. Costs of technology.

   b. Potential state support from grants/subsides.

8. AQMD (snaildarter).

   a. Concern lest the technology and traffic management systems will have an effect on air quality.

   b. Effect of program implementation on air pollution.

9. The general public.

   a. Concern that the new traffic management systems will require an increase in taxes for implementation.

   b. Concern over possible restriction on travel for commuters.

   c. Concern over effect the technology will have on the environment.

10. Taxpayer watchdog group (Snaildarter).

   a. Will be concerned about an increase in local tax increases that might result from purchase of technology.

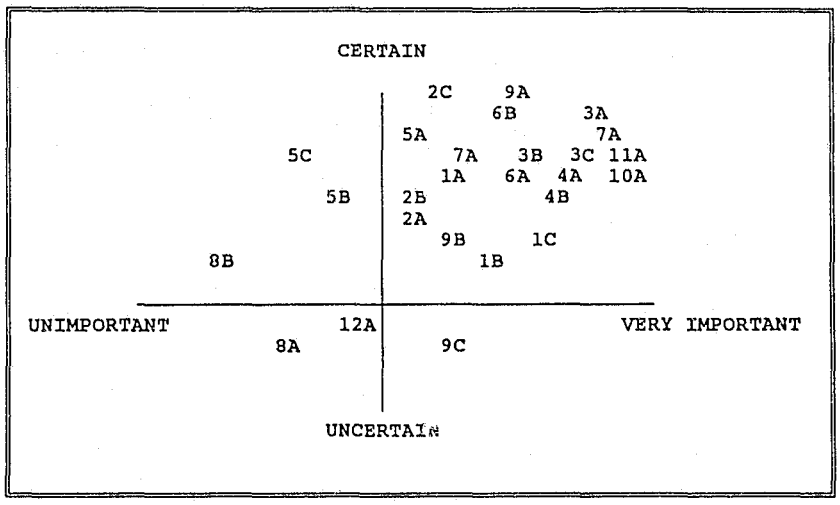
11. News Media

   a. Will be concerned that the traffic management programs are not beneficial to the community.

12. Environmental Protection Agency (Snaildarter)

   a. Will be concerned about any technology that would effect even the smallest element of the environment.

TABLE #5-ASSUMPTION MAPPING



LEGEND

1. The City Council	7. Traffic Engineering
2. Public Transportation Officials	8. AQMD
3. Caltrans	9. The General Public
4. Police Department	10. Taxpayer Watchdog
5. Public Works.	11. News Media
6. Chamber of Commerce	12. EPA

NOTE: Letters (A,B,C) correspond to stakeholder assumptions.

DEVELOPING ALTERNATIVE STRATEGIES

A Modified Policy Delphi approach was conducted by a combination of eight police managers and first line supervisors. A list of alternative strategies was generated.

MODIFIED POLICY DELPHI PANEL

1. Lieutenant John Foster

   Huntington Beach Police Department

2. Lieutenant Patrick Gildea

   Huntington Beach Police Department

3. Mr. Bruce Gilmer
   Traffic Engineer
   City of Huntington Beach, Ca.
4. Mr. Ralph Blackburn
   California Department of Transportation
5. Lieutenant Samuel Spiegal
   Corona Police Department
6. Marwan Youssef
   Traffic Engineer
   City of Westminster
7. Rich Edmonston
   Traffic Engineer
   City of Newport Beach, Ca.

Strategic Alternatives

1. Taskforce approach involving all county representatives.
2. Establish liaison with City Traffic Engineer.
3. Establish liaison with California Dept of Transportation.
4. Establish liaison with Orange County Transportation Authority.
5. Establish a police position within local planning authority.
6. Establish representation with the Federal Highways Program.
7. Liaison with Military to obtain appropriate technology.
8. Contact private sector for information and guidance.
9. Develop local expertise in technology.

10. Locate Federal and State Grants.
11. Establish relations with Academic futurist, i.e. University Departments of Transportation Management.
12. Chief takes lead in program development on local level.

Through a rating process, the alternatives were narrowed to three for detailed analysis. "Pros" and "cons" were identified for each strategy. In addition, each strategy was discussed with respect to how it would be perceived by the stakeholders. After the above analysis was completed, the panel voted on the most useful strategy to be employed.

Strategy # 1:

The following strategy is broad-based in that it involves the maximum number of participants and provides the broadest possible base for input into the final plan. It involves the formulation of a county-wide task force that would include members of all city police departments in the county to address the implementation of technology and the provision of an orderly assimilation into the traffic services environment.

The Chief of Police, through the County Sheriff and Chief's Association would liaison with other county agencies in the establishment of a taskforce for the implementation of traffic management and traffic technology in the county. Representation would include all cities in the county plus representatives from the

sheriff's department. The purpose is to generate a pool of expertise in the county to share and obtain technology. Committees generated by this group would liaison with other representatives from the community at large.

The taskforce would then generate other sub-units to represent the interest of law enforcement on county, state and federal levels. There would be a liaison to all traffic management planning bodies. By having representatives available to all, including the public sector, the local entities would ensure input into project development and planning.

An intregal part of this strategy is the backing of the political elements within the community and the county at large. Political pressure must be exerted in order to gain participation on all levels.

The benefit is a comprehensive development of a county wide traffic management program that is mutually beneficial to the cities.

Pros:

1. Promotes a team concept.
2. Assists all in developing an effective consistent program.
3. Could reduce technology costs.
4. Promotes a united front to the community.
5. Consolidates resources from outside the municipal sphere.

Cons:

1. Could create control problems.
2. Not all technology is appropriate for all members.
3. Inequity regarding budget inputs to task force.
4. The problem of how to divide state or federal subsides.

Strategy # 2:

This strategy would be localized to the City of Huntington Beach itself, and would not involve organizations outside the city. It would involve the formation of a city commission to analyze the technology and the appropriateness for use in the community. The commission would be composed of affected department representatives and concerned citizen groups.

The Chief of Police would initialize the program through the City Administrator's Office. A joint effort with the City Traffic Engineer via representation from the police traffic bureau would be established. The police department would participate on the city planning committees regarding city traffic management. A joint committee would be developed to research technological developments in the traffic management sphere.

The police department would also attend and represent the departments interests in any meetings on the state and county level involving traffic engineering or traffic management.

This would allow the maximum participation of the police department on the local level. It would allow for the acquisition of technology and give the police department input based upon enforcement experience into the system.

Pros:

1. Allows examination by multiple city disciplines.
2. Allows access to in-house experts and trainers.
3. Saves budget money.
4. Promotes a buy-in by all city members.
5. Could bring in community support for programs.

CON:

1. Competition for control of decision-making process.
2. Inter-departmental jealousy.
3. Technology not appropriate to all members.
4. Commission or a Committee creates slow decision-making.
5. Could end in chaos without a useable product.

Strategy # 3:

This strategy would be confined to the Huntington Beach Police Department. Planning, therefore, would be entirely internal to the department. This would involve having the city government instruct the local law enforcement agency, in this case the Huntington Beach Police Department, to develop expertise to evaluate and implement traffic technology.

This would require that the police department develop a unit in the Traffic Bureau for the analysis of traffic technology and traffic management techniques. This would require that the police department make liaison with the public sector in an effort to remain current on developing traffic management technology. The police department would need to train personnel to evaluate potential traffic programs.

The police department would also have to liaison with the traffic engineer to determine what the state and county were proposing for the surrounding areas. This unit would also liaison with adjacent cities to ensure that there would be no conflicts with their programs.

PROS:

1. Allows technology selection by law enforcement.
2. Budget is controlled by one entity.
3. Law enforcement orientated.
4. Selection more palatable to the local organization.

Cons:

1. Training costs.
2. Does not allow adequate participation by other disciplines.
3. Inadequate expertise to evaluate technology.
4. Raises the danger of purchasing antiquated technology through ignorance.
5. Wastes money and organizational time.

Stakeholder perceptions of policies.

Using brainstorming techniques, the Modified Delphi Panel identified the following stakeholder perceptions of the policies selected.

Strategy # 1: The panel felt that the majority of the stakeholders would probably see a task force approach as being beneficial. It would allow a forum to express local agendas. This strategy will allow for the widest application of manpower to evaluate and implement a coordinated plan that is heavy with local input. It also allows for a maximum ability to make use of state and federal assistance for traffic management.

Since there is a central entity, it will provide a singular location for the private sector to present new developments in technology. At the same time those ideas that are local in nature may be presented to the panel.

The strategy would only be successful if a rotational authority structure is established to oversee and guide the taskforce.

The panel felt that, since it is a taskforce that is composed of local representation, it would receive the maximum support from the City Council, Chamber of Commerce and other local political elements. This local support would provide the political influence and strength necessary for the taskforce to be recognized as

an effective tool to implement traffic management technology and programs.

Strategy # 2: A city commission would be viewed as providing more local control. At the same time it may generate readier local acceptance of technology advancements because of local participation. Non-local entities would probably be passive if the decisions did not directly affect them.

On the other hand, the state stakeholders might be reluctant to accept decisions recommended by local government because the state would have little input into the local decision-making process. In addition, the city might not benefit from state supported programs and subsides if the state is not included at the local planning level. The city may not find adequate monetary sources to develop programs alone.

The City would not benefit from the state's access to new technology development. Some technology, by it's very nature, would have to be developed jointly by state and local government to be of benefit to all.

The Public and the Chamber of Commerce may take a negative view of the local efforts due to potential tax costs.

Strategy # 3: It is likely that most of the stakeholders would see this strategy as not being effective or efficient. Law enforcement agencies are not sufficiently trained nor do they generally possess the expertise to develop or apply futures technology without extensive training.

Law enforcement is primarily responsible for the execution of traffic regulations. While law enforcement's input is certainly necessary in the development of any traffic management plan, it does not require that they become experts in the development of the technology. Therefore it is not cost-effective to make them experts in this field.

The panel felt that the stakeholders would rather see qualified organizations develop traffic services technology. It is difficult for technologically oriented agencies to maintain proficiency in this field. Law enforcement would certainly be outclassed in that type of market place.

Recommended Strategy:

Any strategy that is implemented regarding technological advances in law enforcement traffic services hinges on budget, training, and community support. It also requires a concerted effort on the part of the local entity to cooperate with county, state and federal programs. After rank ordering the suggested strategies the panel recommended strategy #1.

The cost of technology in the last ten years has risen dramatically. Individual cities can no longer effectively support programs on the local level. Major technology is being developed to apply on a Federal, State or County level because individual cities do not having sufficient budgets to pay for the research and development of these projects. Smart highways, traffic control services, satellite monitoring require major dollar output that is far above the resources at the local level.

That does not mean that those at the local level must totally lose control of their environment, but it does mean that cities are likely to favor the development of regionalized programs to take advantage of costly technology more readily available at the county and state levels.

Cities must join together to develop comprehensive programs that address budget consolidation for special projects and training of local personnel to attain the expertise to administer new technology. Lobbying on the federal and state level must be part of the overall program.

Community awareness programs must be implemented to promote a buy-in from local residents. Benefits to the community in the form of environment considerations, traffic flow, congestion reduction, and rapid transit must be emphasized.

Task Force Objectives

The tasks to be performed by the task force would involve the following:

1. The development of goals and objectives for a county-wide traffic management plan that makes use of emerging technology and is useable by local law enforcement agencies.
2. The formation of committees to perform the following:
   a. Locate state and federal funding for necessary projects.
   b. Identify potential technology for local applications.
   c. Make practical plans for the implementation of technology on the local level.
   d. Represent the task force in presentations before local city councils.
   e. Coordinate expenditure of revenues from local, state and federal sources.
3. The formation of a master plan to include all recommended applications of technology across the county and within each individual municipality.
4. The dissemination of the master plan to local law enforcement agencies and city councils, as well as to the press and the general public.
5. Negotiation with the political entities in Step 4 above with respect to the acceptability of the plan.

6. Review of the entire planning process before construction funds are spent by local agencies so that construction can be coordinated across the county.

Strategy Implementation

To successfully implement the strategy, action steps, time lines, and resource requirements need to be developed. There must also be a system to monitor and evaluate the plan.

Before specific action steps are taken, it will be important to provide information about the projected plans to four county-wide associations whose membership is likely to be involved in the project at some level. These associations are the following: The Orange County Chiefs and Sheriff's Association, the City Engineer's Association of Orange County, the Orange County Traffic Engineering Council, and the Orange County Traffic Commanders' Association. As can be seen, the first two organizations are composed of highest-level executives in law enforcement and in traffic engineering; the second two are composed of specialists in traffic engineering and traffic enforcement who carry out the policies set by the first two groups.

It would be important for the person who heads the task force to make contact with these organizations and request an opportunity to speak before them at a regular meeting so that persons at both

levels in traffic management and enforcement are acquainted with the general purpose of the project before action steps are taken. It is believed that this will aid in political acceptance of the project within law enforcement and traffic engineering. It is important that these groups realize that the project is not designed to detract from the influence or activities of any one particular group but, instead, to make their task easier.

Action Steps:

In preparation for the implementation of the strategy, the following action steps should be taken:

1. Establishment of a county-wide task force to evaluate and monitor new traffic management services technology.
2. Liaison with city and county traffic engineers to become part of task force.
3. Develop a mission statement, goals and objectives.
4. Establish a plan to enlist community support.
5. Enlist the aid of private enterprise in program development.
6. Establish committees for evaluation of traffic management technology.
7. Evaluate goals, objectives and action plans.

TIMELINE

3 Months	3 Months	6 Months	6 Months	Every 6 Months Thereafter
Establishment of County wide taskforce. Liaison with City and County Traffic Engineers	Develop a Mission Statement and Structure, Enlist Community Support	Liaison with County State and Federal Agencies Enlist Aid from Private Enterprise	Committee Reports	Evaluate Goals, Objectives and Action Plans

▲ ▲ ▲ ▲ ▲

0 MONTHS 3 MONTHS 6 MONTHS 9 MONTHS 12 MONTHS→→→

The steps to form the countywide task force should start immediately. Community support will be an immediate starter with an on-going program to promote technology as it is developed and introduced.

The interfacing with private enterprise should occur concurrently with the development of the county wide task force. This would be the best vehicle to assure that the consumers and providers have the proper platform to view the product.

Resource Requirements:

1. The participating communities will have to commit to representation at the county regional level by their police and traffic engineering departments.
2. Consultants from private enterprise.
3. "Champions" in the community will be required for promotion.
4. Financial support from state and community participants. Some subsidy augmentation from private enterprise.
5. Support from law enforcement and traffic service suppliers.

Monitoring Programs:

The monitoring of the programs should be via select committees of representatives from the participants. The committees should be charged with review and evaluation responsibilities. Since the plan involves state, county and local input it will be necessary to establish a regional hierarchy to complete the task. This hierarchy implies that the control of the program is vested with the state. This does not have to be the case. While the state and counties should and will have great influence in program development the committee setting should allow for adequate influence by local government.

TRANSITION MANAGEMENT

This section will present a transition management plan. This will involve a series of action steps to obtain support from the stakeholders who were identified as critical to the change effort. The following seven were identified by this researcher and three other police managers from the list generated by the group used in preparing the strategic plan. It is anticipated that they will have the most impact and influence on the issues.

1. CALTRANS
2. County traffic engineer
3. City Council
4. Police Chief
5. City traffic engineer
6. Chamber of Commerce
7. Public

Once the critical mass was identified, it became necessary to identify the members' commitment to the proposed change. The commitment chart, Table #6, identifies their present position and the desired position for each.

As can be seen, the categories are Block Change, Let Happen, Help Happen and Make Happen. The chart shows the current position of

each actor as well as the ideal position that actor should occupy.

Table #6-Commitment Chart.

CRITICAL MASS	BLOCK CHANGE	LET HAPPEN	HELP HAPPEN	MAKE HAPPEN
CALTRANS			xo	
CO. TRAF. ENG.			xo	
CITY COUNCIL	x--------o			
POLICE CHIEF			x-------o	
CITY TRAF. ENG.			x-------o	
CHAMBER OF COM.		xo		
PUBLIC	x--------o			
x = Present position		o = Desired position		

It is apparent that four of the critical mass actors will need to be moved to make the management program effective. The following paragraphs contain a brief discussion of each of these actors, their level of commitment and what will be needed to move them to the desired position if a move is necessary.

Commitment Strategy

CALTRANS - CALTRANS' current position is that of a progressive entity. While they are primarily responsible for the implementation of new technology on state highways, it is important for them to participate in the development and implementation of

technology on the local level. Their participation is required to assist in providing access to new technology from a statewide level. This participation will be invaluable to provide information on systems that have statewide as well as local application. Their position of "Help Happen" will continue to require the demonstration of the fact that the majority of advanced traffic service technology does not end at the freeway off ramp. There must be a cohesive collaboration of traffic service providers to ensure the smooth interface of projects. An efficient system for moving traffic off the state highway must be met by a progressive local system to receive that traffic.

County Traffic Engineering - The County Traffic Engineer is responsible for the coordinated movement of traffic in the entire county. His input will be vital for the success of any program. It is therefore essential that he be a member of this task force.

His current position is that of "Help Happen". It will take little encouragement to keep him in this position. It must only be demonstrated that the technology will improve traffic management in the County. CALTRANS, the County Traffic Engineer and local representatives all have a commitment to develop systems that not only benefit the singular but are advantageous to all.

City Council - The City Council is a position to "Block Change". The present environment of slow growth and budget restraints

places them in this position. As long as the City Council can perceive that the implementation of future technology is good for the local entity, and worth the investment, they will move towards a "Let Happen" status. If the City and County traffic engineers, the Police Chief, and the public are in accord, the council will remain in a supportive position.

The strategy is to keep them aware of the cooperation of those entities. Information and positive press make city councils happy. The group felt that it was mandatory to develop a positive liaison with the Council.

Police Chief - The Police Chief's currant position is to "Help Happen" for any issue that can benefit his department. His influence with the Council on traffic-related issues requires that he be moved into the "Make Happen" role.

This can be accomplished by demonstrating that the service or technology can be of benefit to the operational mission of the Police Department. The Police Chief, along with the Traffic Engineer, is recognized as an authority on traffic management.

City Traffic Engineer - The Public Works City Traffic Engineer is in the same position as the County Traffic Engineer, except that his focus is directed towards the City roadways.

His movement to "Make Happen" requires that there is a perceived traffic management benefit to the City. He must be made to realize that cooperation is the key to a successful interfacing of new traffic management technology to city programs.

Chamber of Commerce - The Chamber of Commerce is in the "Let Happen" mode. Innovative traffic management services means that potential customers for the businesses of the city may more freely move into the community. This means an increase in potential revenue for the businesses in the community.

The Chamber needs to be continuously updated as to the benefits of the programs. Business potential must be the emphasis.

The Public - The public is in the "Block Change" mode. They will generally be supportive of traffic management technology that will make traffic movement more efficient. Traffic technology that they do not understand or whose relationship to that end may be suspect. The financial costs must made acceptable compared to the perceived benefits of the traffic management technology.

The key to moving the public into the "Let Happen" mode is information. Publicity as to the benefits will result in public support. A plan to educate the residents through the media, meetings and public presentations should be used. This pressure will be felt by the City Council, the Chamber, and across the board.

The result should be a cohesive and supportive response to traffic services.

Transition Management Structure

After identifying the Critical Mass and the influences necessary to allow the recommended strategy to function, it became necessary to identify the transition manager. Since the issue deals with a topic that crosses many boundaries, yet is focused locally, the Police Chief and the City Traffic Engineer have been selected to implement the strategy. These two individuals possess the necessary skills covering both the public works and law enforcement components of city government. They have the authority to develop the teams and command the respect of the entire task force. This will also allow both disciplines of engineering and law enforcement to be applied in a supervising role. It is important to remember that the original issue question is dedicated to law enforcement traffic services. The Police Chief must play the superordinate role in that he must be the critical "Make Happen" actor, even though there is a joint responsibility regarding the implementation of the strategy.

The Critical Mass indicates the Police Chief and the City Traffic Engineer are extremely important to the success of this task force. They will have to remain in a visible position giving support to the program. Both will undoubtedly select a ranking member of their staffs to jointly head the transition management

team. These representatives must have outstanding interpersonal skills, a strong commitment to change and the respect of the other task force members. They still must be ready and informed to step to the front on critical issues.

The Transition Managers will have to identify the activities that will be necessary to complete the transition to a task force concept to manage and apply new technological developments. The activities that need to be accomplished are:

1. Formation of the task force.
2. Development of a system of authority within the task force.
3. Development of a protocol for obtaining and evaluating new technology.
4. Development of a protocol for a budget/financial plan for the implementation of approved projects and support of the task force.
5. Preparation of a system to keep the public and the media informed.
6. Provision for feedback to members.

Implementation Technologies

An effective transition plan must employ several methods which will support it's implementation. Plans to control anxiety and uncertainty must be made. Plans that involve consistency, open

lines of communication and a sufficient time period for change to occur are equally important.

The use of a task force to manage the impact of emerging traffic management technology will insure that the community will benefit from the most current technology available. Another advantage is a centralized platform for vendors to present their products.

The sub-issue of budgeting will not initially be a problem as the task force is assembled. Consideration of joint budgeting will have to be a primary topic of the task force after it is formed in order to insure equitable contributions for implementation of traffic management projects. It will be the task force's responsibility to develop an acceptable format that is equitable to all participants.

Responsibility Charting

To ensure that theses activities are performed, a responsibility chart must be created. This will allow all of those on the task force to be aware of who is responsible for the completion of specific tasks. All critical mass actors should meet and discuss responsibilities. There are four areas of consideration; **R**esponsibility, **A**pproval, **S**upport, and **I**nform. (RASI)

Table #7-Responsibility Chart.

ACTORS / TASKS	CAL-TRANS	CO.TRAF. ENGINEER	CITY COUNCIL	POLICE CHIEF	CITY TRAF ENG.	CHAMBER OF COMM.	PUB
FORM TASK FORCE	I	I	A	S	R	I	I
DEV. AUTHORITY STRUCTURE IN TF	I	I	A	R	S	I	I
DEV.PROTOCOL TO OBTAIN/EVAL NEW TECHNOLOGY	S	S	I	S	R	I	I
DEV.PROTOCOL FOR BUDGET AND IMPLEMENTATION OF PROJECTS	I	I	A	S	R	I	I
SYSTEM TO KEEP PUBLIC INFORMED	I	I	S	R	S	S	I
PROVIDE FEEDBK TO MEMBERSHIP	I	I	I	I	R	I	I

R-RESPONSIBILITY
A-APPROVAL (RIGHT TO VETO)
S-SUPPORT (PUT RESOURCES TOWARDS)
I-INFORM (TO BE CONSULTED)

CONFLICT MANAGEMENT

Once the task force is developed there must be a system to manage conflict. The very nature of a multiple discipline structure will generate some conflict. Conflict is healthy unless taken to excess. It then threatens the mission of the group. The focus

should be on the issues affecting the task force, not on personality. The emphasis on cooperation will benefit all.

FUTURE VISION

There must be an emphasis on the future of the project. Every member should share a similar vision of the benefits to a group made up with such varying backgrounds and responsibilities. There should be a commitment by all to the betterment of their community and an enhancing of the quality of life for the public. The public should be made aware of the benefits of the program.

INFORMATION SHARING

Sharing information is the key to any successful program. Failure to share or a lack of information is detrimental to the success of any operation. Information shared, results in progress! The entire concept of a taskforce indicates a high level of cooperation between the participants. The concept is based upon it's ability to gage a wide spectrum of information thus allowing the group to benefit from the experience of all.

SHORT RANGE CHECKPOINTS .

It is crucial that short range checkpoints be developed, so that the progress of the task force may be evaluated. This provides a feeling of success in the group as they are reached and promotes

the task force unity concept. Group notification of the completion of Action Steps, information pertaining to development of specific technology or implementation of technology should be relayed to the entire taskforce.

CELEBRATIONS

As the task force attains the checkpoints, celebrations of the event should occur. There should be encouragement to develop logo's, mottos, and rituals that are unique to the task force. No opportunity should be missed to promote comradeship and unification of task. These celebrations should include more than the task force itself; they should include the community at large so that the various stakeholders can share the progress made.

Final Recommendation/Transition Management.

The City has a significantly greater chance of obtaining the highest level of traffic technology by 1996 if it follows the above strategies, management structure, technologies, and methods. It will benefit from not only the quality of the technology, but from the cost and the expertise pool that can be assemble in this format. It is imperative in these economic times that all agencies strive to benefit from consolidated energies. Not sharing knowledge and resources can be detrimental, not only to a community, but to a region.

Good lines of communication must be established and a means of receiving feedback implement. As a result, anxiety and uncertainty during the transition period will be significantly reduced. Effective management during the transition period is imperative. Criticisms, setbacks, and even failure can result without a competent transition management plan.

CONCLUSIONS

Issues and Sub-issues

This study was designed to answer the following issue question:

> **"What will be the future impact of emerging technology to law enforcement traffic services in a mid-size community by the year 1998 ?"**

In addition, the study also addressed the following sub-issues, seen as components of the above issue question.

1. **What form will the delivery of emerging technology take?**
2. **How will law enforcement acquire expertise in handling technology?**
3. **How can law enforcement increase its input into the planning phase for the delivery of emerging technology?**

Discussion

The data collected in this study appear to indicate that technology has the capacity to have an enormous effect both on traffic management and on the enforcement of traffic laws. The data also indicate that, for this to take place, careful political handling is necessary.

These data also indicate, however, that the introduction of such technology can cause considerable problems for local agency traffic bureaus. Agencies at the county and state levels frequently are not aware, and do not deem it important to make themselves aware of local conditions. Furthermore, they are also ignorant of the difficulty of enforcing the regulations required by such installation. As with local traffic engineering sections, it is important, therefore, that they receive input from local traffic enforcement bureaus before plans are finalized.

Sub-issue 1. The form that the technology will take is largely electronic in nature, and involves information dissemination about traffic conditions, devices to improve vision at night, warning devices and systems of providing prompt notification of accidents.

Many of these devices are likely to be useful only on major arteries or on secondary highways. It is doubtful that they will be useful on ordinary surface or side streets in the individual community. They must, however, be designed so that they operate in a coordinated manner with local traffic regulation systems. It is for this reason that the county-wide task force described below was provided as part of the overall plan.

Sub-issue 2. Law enforcement will acquire the necessary expertise through the use of a task force to provide a forum through

which both the public and private sectors could provide information to local law enforcement agencies about emerging technology. As envisaged, this task force would be composed of traffic engineering representatives at the county and state level as well as both public works traffic engineers and local police traffic bureau personnel. Further, this same task force would enable local law enforcement agencies to cooperate in decision-making regarding exactly which technology is to be introduced to local areas.

The advantage of the centralized forum is that it allows local law enforcement agencies the opportunity to obtain training and expertise in the emerging technologies. This would both provide a venue for showcasing of newly-developed technology, a decision-making forum where county-wide discussion of mutual problems could take place and a place where involved community representatives could obtain training on new technology as a group.

Sub-issue 3. Once again, the taskforce referred to above will be used to enable local law enforcement agencies to provide input into area-wide planning. This will mean that, whatever the area-wide plans may be, local traffic engineers and local traffic bureau managers will be able to provide input with respect to potential local problems created by the introduction of new technology to their area.

As was shown in the data collected, past experience has shown that plans drawn up by traffic engineers who have little or no knowledge of local conditions and installed by area agencies can create serious problems for local police agencies. Without local input, major alterations in highway construction can create situations that pose severe danger to local residents and render the enforcement of traffic regulations difficult to impossible.

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