WHAT IMPACT WILL A STOLEN VEHICLE RECOVERY NETWORK HAVE ON LOS ANGELES COUNTY WITHIN THE NEXT 10 YEARS?

BY
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COMMAND COLLEGE CLASS VIII
PEACE OFFICER STANDARDS AND TRAINING
SACRAMENTO, CALIFORNIA
1989

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

Studying the future differs from studying 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.**

PART ONE - A FUTURES STUDY

Is a system available to track and locate stolen vehicles within Los Angeles County?

PART TWO - THE STRATEGIC PLAN

The development of a strategic plan to enhance law enforcement's ability to locate stolen vehicles in Los Angeles County.

PART THREE - TRANSITION MANAGEMENT

How can Los Angeles County Law Enforcement agencies manage the implementation of a stolen vehicle recovery network during the next 10 years?

Abstract

PEACE OFFICERS STANDARDS AND TRAINING
(POST)

Supplementary Executive Summary

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J. Woolum. Sponsoring Agency: California Commission on Peace Officer Standards and Training. 1989. pp.
Availability: Commission on POST, Center for Executive Development, 1601 Alhambra Blvd., Sacramento, CA 95816-7053.
Single copies free; Order number 8-0152
National Institute of Justice/NCJRS Microfiche Program, Box 6000, Rockville, MD 20850.
Microfiche free. Microfiche number NCJ _____

Abstract

The report consists of three sections: a futures study of technology impacting the ability to locate stolen motor vehicles, a strategic plan enabling law enforcement agencies to adapt technology to enhance the rate and timeliness of recovery of stolen vehicles, and a transition plan enabling the shift from the present state to a desired and obtainable future. Trends affecting the issue are identified and projetced through the next 10 years. Events with a high probability of occurrence are identified. Their impact on the issue as well as other events and trends are analyzed. The strategic plan recommends a regional Stolen Vehicle Recovery Network which uses radio direction finding as a tool to assist law enforcement. Future applications are discussed. The transition management plan presents management tools to support implementation, evaluation, and advancement of the network. Demographic data, group forecasting results, graphics in text, appendixes, references, and bibliography.

What Impact Will A Stolen Vehicle Recovery Network Have On Los Angeles County Within The Next 10 Years?

by

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Glendora Police Department
Order Number 8-0152

Supplementary Executive Summary

PART ONE - A FUTURES STUDY

More than a quarter million motor vehicles are stolen each year in California, of which approximately 43 percent occur in Los Angeles County. Motor vehicle theft has been viewed as a property crime for many years, but trends indicate an increasing number of vehicles being taken by force or being used in a crime of violence. A review of technology associated with the tracking of vehicles, vessels, and aircraft, literature scanning, and a visit to view an operating stolen vehicle recovery network revealed an application of radio direction finding techniques that can be effective in locating motor vehicles which have been reported stolen.

A nominal group of 10 individuals reviewed the question "What Impact will a Stolen Vehicle Recovery Network Have on Los Angeles County in 10 Years?" The group identified five issue trends and five events with a high probability of occurrence. The impact of each event upon the other events and the trends was projected by the group. Three scenarios, each describing a possible future of the motor vehicle theft problem in Los Angeles County, were prepared based on the trends, events, and the cross-impact analysis.

PART TWO - THE STRATEGIC PLAN

The purpose of the strategic plan is to bring about one of the scenarios described in the Futures Study. A desired and obtainable future which describes a county-wide stolen vehicle recovery network using radio direction finding equipment initially, and satellite technology in the future, was chosen for further development in the planning section. An environmental analysis, identification of law enforcement capabilities and resources, and identification of individuals or groups with a vested interest in the issue was undertaken. Mission statements for law enforcement, in general, and the Stolen Vehicle Recovery Network, specifically, led to the identification of three policy alternatives. These alternatives are evaluated in terms of advantages and disadvantages. A recommended alternative as well as a management structure and evaluation criteria are identified.

PART THREE - TRANSITION MANAGEMENT

Transition from the present state to a desired future state can create uncertainty and anxiety. The transition plan identifies the minimal set of individuals required to create the desired change, their position in relation to the issue, and the position that is necessary to successfully implement the recommended alternative in the strategic plan. A responsibility chart lists key decisions during the transition period and identifies the role of individuals and groups in the process. The transition plan is designed to reduce uncertainty and anxiety as the issue progresses into a desired future.

PREFACE

Laws and law enforcement often lag behind the criminals in innovative techniques for exploiting technological change. Historically, there has been no effective method of locating stolen motor vehicles. Police officers must rely on instinct and acute observation skills to detect some factor which would cause an inquiry through the Department of Justice computerized files to determine if a vehicle is stolen. All too often, an officer initiates enforcement activity without the knowledge that a vehicle is stolen, creating a serious hazard to the officer, and others. Technology is available to turn the situation to the benefit of law enforcement. To obtain a regional Stolen Vehicle Recovery Network, government must unite with private industry and consumers. The purpose of this report is to present background data regarding available and future technology, strategies for implementing a regional network, and a transition plan to provide for orderly advancement from the present state to a future where cars can cry for help when they are stolen.

ILLUSTRATIONS

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PART ONE - A FUTURES STUDY

Is a system available to track and locate stolen vehicles within Los Angeles County?

"Wouldn't it be great if cars could cry for help when they're stolen?" David Horowitz posed this question to the viewers of his syndicated consumer report on NBC News on January 15, 1987. Mr. Horowitz had good cause to raise this issue as motor vehicle theft is of concern to most Americans. The cost of this crime to society is considerable, amounting to almost $29 billion in the period of 1973 through 1985.

Motor vehicles are the most frequently used form of transportation in the United States. Of $350 billion spent on transportation in 1985, more than $320 billion was spent for the purchase and maintenance of motor vehicles. Spending for motor vehicles amounted to 12 percent of all personal consumption expenditures. Because most people rely on motor vehicles for transportation, when a vehicle is stolen, its theft causes inconvenience to household members, time is often lost from work, and household spending is affected.

THE MOTOR VEHICLE THEFT PROBLEM, PAST AND PRESENT

Between 1973 and 1985, 12,338,000 motor vehicles were stolen in the United States. This was a rate of seven thefts per 1,000 registered motor vehicles.

While motor vehicle theft is viewed primarily as a property crime, a household member was present in about 9 percent of all motor vehicle theft incidents, and in 3 percent, the offender either threatened or physically attacked the victim. In Southern California, law enforcement teletypes indicate an increasing number of motor vehicle thefts as the result of physical confrontation. Media exposure was drawn to this type of automobile theft in March 1989 when comedian Don Rickles was accosted by a gunman and robbed of personal possessions and his late model Jaguar. A secondary trend is the theft of a motor vehicle to be used to facilitate the commission of a more serious crime. This was illustrated in an armed robbery where a stolen vehicle from Redondo Beach was used as transportation during the robbery and

murder of an armored transport guard in Lakewood, California, four days after the theft.

Blacks, Hispanics, households headed by persons under age 25, people living in multiple-dwelling units, residents of central cities, and low income households are among the most likely to be victimized by motor vehicle theft.

During 1988, 267,229 vehicles were stolen in California resulting in a loss of $890 million. One out of every 82 vehicles registered in California is stolen, affecting one out of every 105 residents. Of the vehicles stolen, 238,212 were recovered, representing an 89.1 percent recovery rate. Sixty-one percent of the recovered vehicles were intact and in drivable condition; 18 percent were stripped of minor parts; 10 percent were missing the major component parts; and the remaining 12 percent were intentionally burned and/or wrecked.[1]

Vehicle thefts in Southern California account for almost two-thirds of the motor vehicle thefts reported in the state. Approximately 43 percent of all vehicle thefts in California occurred within Los Angeles County. Three of the top ten law enforcement agencies reporting incidents of vehicle thefts are within Los Angeles County: Los Angeles Police Department (60,809); Long Beach Police Department (5,844); and Los Angeles County Sheriff's Department (18,850).

Attempts to reduce the impact of motor vehicle theft has included the application of Vehicle Identification Numbers (VIN) rather than engine numbers for registration purposes in 1955, the introduction of the locking steering column in 1968, and the standardization of a 17 digit VIN in 1981. Numerous add-on devices such as "kill switches," which disables the ignition and locks to make the steering wheel immobile even if the factory-installed lock is defeated, have been developed and marketed through the years.

According to Paul W. Gilliland, President of the National Automobile Theft Bureau:

> The escalation of vehicle theft related crime during the past decade has certainly placed a financial drain on the U.S. Public, involving billions of dollars in property losses, increased costs for law enforcement and the entire criminal justice system, and rising insurance rates. Vehicle theft is still classified as the worst property crime when compared with related costs for larceny-theft, arson, and burglary as recorded in the Federal Bureau of Investigation's Uniform Crime Reports for 1987.[2]

Gilliland noted that there have been increases in the number of vehicle thefts in 27 of the last 31 years.

Vehicle theft has reached such serious proportions that it cannot be controlled by law enforcement alone. Any real solution requires cooperative efforts by motorists, representatives of law enforcement, the judiciary, government, and industry. The motor vehicle theft problem will be targeted in 1989 by the California League of Cities' Public Safety Policy Committee which will evaluate new methods to reduce the incidence of this crime.

THE MOTOR VEHICLE THEFT PROBLEM IN THE FUTURE

The vehicle theft rate has been recognized as the primary factor influencing the rise in the California Crime Index (CCI) for several years. Data suggests the rise will continue in the future. Factors that contribute to motor vehicle theft levels are listed below:

* Increased opportunity as measured by motor vehicle registrations
* Potential Offenders as measured by population trends
* Increased demand for stolen vehicles to dismantle and resell
* An increase in the number of organized motor vehicle theft rings

The strong upward trend in motor vehicle theft crimes is correlated with a similar increase in total vehicle registrations, suggesting that

increased opportunity is an important factor. Motor vehicle theft crime increased 48.9 percent between 1976-1986. Total vehicle registration increased 36 percent during the same period. Total vehicle registrations are expected to increase by 16 percent within the next 10 years.[3]

An examination of age group population trends from 1976-1986 shows that the number of teenagers (12-17 years of age) and young adults (18-24 years of age) did not increase, while motor vehicle theft crimes increased significantly. The age profile for persons arrested for motor vehicle theft is younger than for all other index crimes. Motor vehicle theft arrestees are most frequently 15 to 18 years old. The most frequent age of those arrested is 16, while the most frequent age for all other offenses is 22. As we move towards the next century, the number of young people will compose a smaller percentage of the population. However, the slight population changes noted for young, crime-prone groups do not appear sufficient to impact motor vehicle theft trends.[4]

Motor vehicle theft is a problem which will continue into the next century. Anti-theft systems are now standard on at least 16 car lines sold in the United States and are options on several others. Proposed solutions to the problem included anti-theft devices, alarms, and devices to disable the vehicle if appropriate keys or switches are not used by the driver. Buyers have been reluctant to equip their vehicles with these devices. One reason for the reluctance might be that existing anti-theft devices are not seen as the perfect solution.

A Stolen Vehicle Recovery Network (SVRN) has been proposed for Los Angeles County which would combine the values of the anti-theft devices with an electronic device which would assist law enforcement in tracking and locating vehicles which have been stolen. A synthesis of prevention with rapid recovery and reduced financial impact is viewed by many as an emerging future in the area of motor vehicle theft. The proposed SVRN uses existing technology, land based radio direction finding, which has been adapted to the unique situation of motor

vehicle recovery. The application of the technology in this manner is both innovative and experimental.

Can the rate of motor vehicle theft in Los Angeles County be impacted through an electronic tracking system within the next ten years? As the first step in addressing this question, an overview of existing tracking technology as well as future applications of tracking satellite technology will be presented.

TRACKING TECHNOLOGY FOR AVIATION AND NAVIGATION

Electronic tracking technology has been used in aviation and navigation since World War II. Common navigation systems that involve reception of radio waves include Loran, Omega, Omnirange, and Radio Direction Finding.

Loran, which stands for Long Range Navigation, is used to help ships and aircraft find their positions. Two stations, known as the master and slave stations, continually send out radio signals. A receiver aboard the ship or aircraft uses the signals sent by these stations to establish a loran line of position. The location of the craft is at the point where the lines of position derived from two pairs of loran stations intersect on a chart. In most cases, a single master station is paired with two slave stations. Two major types of loran are in general use over large ocean areas: Standard loran (loran A) and low frequency loran (loran C). Loran A, developed during World War II, operates at a radio frequency between 1750 and 1950 kilohertz (kHz). Useful ranges are about 750 miles over water in daylight and twice that distance at night. Accuracy of location varies from a fraction of a mile to several miles, depending on ionosphere conditions. Loran C, developed after World War II, operates at a radio frequency of 100 kHz. This type of loran is used in the United States and Canada. A loran C signal has a range of more than 1,000 miles during the day and can be received more than 3,000 miles away at night, when low frequency radio waves travel further. Chains of loran C stations provide coverage of large areas of the North

Pacific and North Atlantic Oceans and the Mediterranean Sea. A position can be located within one-quarter mile.

Omega is a world wide navigation system for planes and ships. The system has eight transmitters throughout the world and operates with international cooperation. Equipment aboard a vehicle receives and processes the radio signals sent by two Omega transmitters. This equipment establishes two lines of position for the vehicle. The vehicle's position is at or near the point where the lines of position cross. The theory of the Omega system is being enhanced through the deployment of eight satellites. The satellites will be able to locate the position of a transmitter, small enough to be carried by an individual, within 50 feet world-wide.

Omnirange is a short range navigation system for aircraft flying over land. A receiver electronically traces the signal of a omnirange transmitter to determine the bearing of the transmitter from a plane. The location of the transmitter is shown on the aeronautical chart.

Radio direction finding involves locating the bearing of a transmitter called a radio beacon. A radio beacon's signal is received aboard a vehicle by a radio direction finder. The antenna of the radio direction finder is turned to find the direction of the radio beacon. The radio direction finder shows when the antenna is pointing towards the beacon. Radio direction finding is one of the oldest electronic navigation systems for aircraft and ships. The range of the signal depends on the type of radio beacon.[5]

The aviation industry has also employed tracking technology through the development of emergency locator transmitters (ELT). An emergency locator transmitter is a small, self-contained radio transmitter which is activated automatically by the impact force of a crash or manually by an "on-off" switch. An ELT transmits a distinctive variable tone on the emergency frequencies 121.5 and 243.0 megahertz. The range of an ELT varies from 75 to 150 miles, depending on environments. Its

useful life varies from three to eight days; depending on battery condition. An ELT does not identify the aircraft from which the transmissions originate and until recent improvements were initiated, did not narrow the search area. Computer technology has allowed the linking of the loran C navigation system with ELT technology so that the location of an airplane can be broadcast simultaneously with the ELT signal. While the identity of the aircraft is still unknown, searchers are looking for distinctive characteristics such as an aircraft on the ground or debris from a crash.

TRACKING AND NAVIGATION BY SATELLITE

The United States Defense Department has developed the Global Positioning System (GPS) which operates through a constellation of 24 satellites. While only 21 satellites are needed to operate the system, three "spares" have been planned to provide coverage during "station keeping" maneuvers in which the satellite must be inoperative for three days and to provide time necessary to replenish satellites that are reaching the end of their mission lives. Seven of the original 10 satellites launched are still operational. Although an operational life of five years had been estimated, the first four satellites launched have been operating for more than 10 years.[6]

The GPS suffered a setback when the Challenger shuttle explosion temporarily delayed the space program. Satellites had been deployed by shuttle missions. The seven operational satellites cannot provide 24 hour coverage. Complete global coverage won't be available until the early 1990s when 18 satellites are in position providing 24 hour service. Two additional satellites have been launched, one in late 1988 and one in 1989, in a continuing plan to complete the GPS.

The GPS was designed as a military system which gives defense department approved users at least 15 meter position accuracy. The GPS, once fully operational, offers the user both accurate position and time. Simultaneous signals from three satellites can determine surface position (latitude, longitude, and time). A fourth satellite

allows altitude determination. With a fifth satellite, the user can monitor a second frequency for correction of ionospheric variations. Concern over an enemy having access to a system with that degree of accuracy world-wide caused the Pentagon to add errors to the signal which would degrade civilian accuracy to 100 meters for two dimensional (latitude, longitude) navigation. As a hedge against unilateral degradation, some potential users would like a receiver that could use both the GPS and the Soviet Global Navigation Satellite System (GLOSNASS).

Studies concluded that the 100 meter navigation accuracy was sufficient for the bulk of civil air needs. But some civil users are concerned that the United States might degrade the system further because of a perceived threat. Some potential customers argue that as GPS use increases, the number and power of constituents will make degradation to more than 100 meters politically unacceptable.[7]

TRACKING APPLICATION IN PRIVATE INDUSTRY

An increasing number of civilians are already using Global Positioning Satellites (GPS) for navigation and precise time-date measurement according to reports presented at the Institute of Navigation's International GPS Conference held in September 1988. With current technologies, it will soon be possible to have a fully functioning GPS receiver in a 100 cu. cm. package, about the size of a box of king sized cigarettes. Prices are also decreasing and estimates place prices for receivers in the area of $3,000-$4,000 by 1995.[8]

To demonstrate the application of the GPS and ground receivers for civilian application, Valentine L. Denninger, Vice President of Trimble Navigation, walked around the Paris Air Show in June 1987 with a battery powered receiver in his briefcase. The receiver, which weighs only 2.53 lbs. including the antenna, is about the size of a Kleenex box and has the ability to track Denninger's position to within 15M and immediately report it out. The Trimble receiver is priced at about $13,000 or under $5,000 in 1,000 unit volume. That's

about half the price of units built only last year and only volume production is needed to bring receiver cost down to $200 which would make it suitable for automobiles.[9]

One major construction firm has invested in the GPS technology hoping to make it possible to control the blade angle on earth moving equipment so as to dig an absolutely level grade. Another application would be to measure minute changes in the position of a dam or a building to detect structural weakness or earthquake damage.

Private industry is using satellite technology provided by Geostar Corporation to accurately track fleet vehicles. Currently, the broadest customer base for the service is the trucking industry which uses the system to locate the position of cargoes, control inventory, and pinpoint and speed delivery times. Foreign competition has caused manufacturers to demand "stopwatch" deliveries from their suppliers, and trucking companies are being required to deliver parts or raw materials within 24 hours of actual use for production.

The Geostar system is based on loran C and uses L band satellite frequencies set aside for mobile communications by the Federal Communications Commission. The system uses a "black box" transmitter that is put in the cab of a truck, and a six-inch, saucer type antenna. The vehicle transmitter sends coded data to the satellite, approximately 22,000 miles above the earth. A satellite transponder relays the digital information to Geostar's Washington, D.C., communications center where it is either immediately sent to the transport companies' computer, or put in an electronic "mailbox" for pick up during the companies' next inquiry of the communications center. As more companies sign up for the service, it may become cost effective to send the center's signal to transport companies through another satellite link.

In addition to the vehicle locating system, one-way messaging is available which allows the driver to communicate with the headquarters. Drivers use a miniature keypad that can send

pre-established messages or notification of emergencies. This technology allows fleet operators to better use their equipment to locate specific loads, communicate with customers, and route trucks to customers in a timely and profitable manner. Satellites are ushering in a new age of effectiveness for fleet owners.

Automatic Vehicle Monitoring (AVM) is a system through which dispatchers or general alarm stations can identify the location of any vehicle, boat or mobile unit in a fleet that is equipped with special transmission equipment. AVM uses digital information to provide the position of each unit in a group of vehicles. The AVM also provides instructions through supplementary voice or data messages and can provide routing service as to the optimum route. The area displayed on an AVM dispatcher's screen can be as large as a city or as narrow as a three block area, depending on the specific needs.

AVM systems use proximity sensing, dead reckoning, or multilateration to determine the whereabouts of vehicles.

Proximity sensing uses detectors at signposts or roadside imbedded magnets to locate nearby vehicles.

Dead reckoning in which a vehicle's speed, direction, and distance are registered by equipment located on the vehicle. Position is computed in the vehicle and/or at a central station.

Multilateration determines the locations of a vehicle by the difference in time of arrival of signals received from fixed sensors, which can be placed beside the road. The multilateration concept has been advanced by the Teledyne Systems Company by using Loran C. Multilateration currently appears to be the most popular determination system in use by AVM companies.[10]

AVM systems also provide information relating to theft, intrusion, and vandalism to the base station so that law enforcement can be notified. AVM equipped vehicles can be tracked to its destination

when stolen. Sophisticated systems give the dispatcher the ability to turn the vehicle engine off, detect fire, mechanical breakdown, or excessive moisture. Mobile Electronic Tracking Systems, Inc. (METS) of Indianapolis, Indiana, provides a modular AVM system which includes software customized to the needs of the customer. METS uses satellite technology in the trucking industry and views their systems as "vehicle management systems" rather than mere monitors. METS is developing a stolen vehicle recovery system for use in the United States. The system will be discussed in the next section. METS has been active in Europe using RDF technology for surveillance systems in both civil and law enforcement applications.[11]

TRACKING APPLICATIONS IN LAW ENFORCEMENT

Tracking technology in law enforcement has been applied in several fields. The most traditional use has been the "bird dog" or "bumper beeper" system which is designed to allow law enforcement officers to surveil a specific vehicle's movement during the course of a criminal investigation. The system provides constant directional information of a vehicle through the use of a transmitter which has been concealed on the undercarriage, bumpers, or other accessible area of a target vehicle. The transmitter, which is designed to be as small and concealable as possible, emits a pulsated radio frequency signal that is detected and monitored by a receiver in the tracking vehicle. The life span of the transmitter varies with the power source. Units are designed to operate with power from the vehicle's electrical system, or batteries can provide five to seven days of continuous operation.

A "Bird Dog" is used for specific vehicles which are associated with persons under investigation. Investigators know, for example, that they are following a 1988 Mercedes-Benz with known color and license plate characteristics. Use of tracking technology for surveillance is generally reserved for major investigations such as high level narcotics traffickers and organized crime figures. Tracking units of this nature provide an effective method of maintaining surveillance of a vehicle from a discreet distance, with a minimum of personnel and

without the necessity of continuous visual contact and its accompanying risk of compromise.

Some law enforcement agencies have been using tracking technology since the mid 1970s to determine the location of patrol and investigation units. The Automatic Vehicle Locator (AVL) systems were initially designed to display the location of police vehicles on a map in the dispatch area. The operation and advantages of these systems are parallel to those of the Automatic Vehicle Monitoring (AVM) systems previously discussed, without the advantage of supplementary voice or data transmissions.

Several police agencies have upgraded their equipment from AVL systems to AVM technology to enhance officer safety, emergency response, and personnel management functions. The role of law enforcement makes the AVM an ideal system for directing vehicles to the scene of an emergency.

Texas Instruments developed an electronic tracking system (ETS) consisting of a tag, a miniature transmitter concealed within a packet of currency or upon identifiable property, and a radio direction finder (RDF) tracker capable of tracking a tag to its location. The tags are deactivated by a magnetic base installed in the bottom of a cash drawer or beneath the property to which the tag is attached. The tag becomes active and commences transmission of an electronic signal when removed from the magnetic base. A network of remote receivers are strategically located within the geographical area and are connected to displays in law enforcement communications centers. Receivers can also be located at primary exits from a city or fixed points, such as bridges. Once the communications dispatcher advises that there has been an activation of a tag, officers use tracking receivers in their patrol units or helicopters to track the tag to a specific house, car, or person. Hand held trackers can be used if it is necessary for the officers to leave their vehicles to continue the search, such as a search of an apartment complex. The tags are not specific in identification; that is, they all transmit the identical signal. An

officer does not know immediately whether they are tracking money from a robbery or a television set from a window smash burglary. Law enforcement must rely upon the victim to contact them to determine the location and nature of the crime. Officers have located, pursued, and arrested individuals (on unrelated crimes) before the tag was identified. The ETS has been used in Shreveport and Bossier City, Louisiana; Austin, Texas; Anchorage, Alaska; Las Vegas, Nevada; and in California by San Francisco, Sacramento, and Los Angeles Counties.[12]

In California, the Sacramento Police Department and Sheriff's Department obtained grant funding for an ETS from the Office of Criminal Justice Planning to enhance their capability of arresting and prosecuting career criminals.

RDF technology similar to the Texas Instruments application has been used in search and rescue operations. Recco Rescue of Irvine, California, manufactures tiny transponders which stick to boots or clothing. The device allows rapid tracking of lost skiers, avalanche victims, or hikers by searchers using hand held or mobile detectors. The device has been credited with saving the life of a skier near Parpaner, Switzerland, who was located buried under three feet of snow after a spring-time avalanche. A detector mounted on a search and rescue helicopter located the skier nine minutes after a search was initiated. Locators cost $20 a pair and need no maintenance or batteries.[13]

Mobile Electronic Tracking Systems (METS) Inc. is currently developing a security system to address the motor vehicle theft problem. Vehicles are equipped with a dormant transmitter which is controlled by a keypad in the vehicle. If a personal identifying code is not entered within a specific time after entry, the transmitter alerts a central dispatcher who attempts contact with the vehicle owner/customer. The dispatcher verifies the status of the vehicle and, if a crime has occurred, notifies the appropriate law enforcement agency. METS does not contact law enforcement until the dispatcher

makes contact with the customer. This procedure reduces the probability of false responses by law enforcement personnel. When a vehicle has been stolen, METS dispatchers have the capability to "map" the vehicle, that is, view the vehicle's position on an electronic display and notify law enforcement of the nearest cross streets. The unit is specific to a vehicle and the METS dispatcher can advise responding officers of the identifying characteristics of the vehicle which they are seeking. Once in the area of the vehicle, law enforcement officers would use radio direction finding tracking units in the police car to direct them to the stolen vehicle.[14]

In July 1986, the Massachusetts State Police Department implemented the LoJack Stolen Vehicle Recovery System. The system consists of a transmitter about the size of a blackboard eraser which is purchased by the car owner, a series of radio transmitters connected to the state run LEAPS Computer System, and tracking units in the police cars. When a vehicle owner purchases a LoJack transmitter for his/her vehicle, the vehicle identification number (VIN) is entered into a computer base. The VIN's of all vehicles reported stolen are checked against those in the data base. If the VIN number of a vehicle reported stolen matches with a VIN in the LoJack data base, the LoJack transmitter is activated and sends an electronic signal each 15 seconds on a frequency allocated to the Massachusetts State Police on a temporary basis by the F.C.C. Various police agencies use a tracking device in their patrol cars to intercept the signals transmitted by the LoJack units. The tracker system combines a unit inside the car, which displays a coded identifier distinctive to an assigned vehicle, a 360 degree Light Emitting diode (L.E.D.) "compass," and an indicator which displays signal strength with four phased antennas on the roof of the vehicle. Once an activated unit is detected by a tracking unit, the coded identifier provides the officer with the opportunity to "inquire" through the state police crime computer to determine the make, color, and license number of the vehicle to which the LoJack unit has been assigned. The computer inquiry speeds the rate of transmission by the unit from one signal per 15 seconds to one signal per second to assist officers in locating the vehicle. The officer

simultaneously confirms the vehicle as a stolen vehicle and is advised of any additional information such as use of the vehicle in other criminal activity. The officer uses the L.E.D. "compass" and the signal strength indicator to track the vehicle and locate it. Experienced officers can determine if a vehicle is mobile or stationary by the sound of the unit's transmissions and the signal strength indicator. After the vehicle is located, the computer update entered by the police reverses the process and initiates a radio signal which turns off the transmitter. The transmitter remains dormant unless reactivated due to another theft. Some vehicles have been recovered three times through their LoJack unit.

Between July 1986 and December 1988, 500 cars equipped with LoJack units have been recovered in an average of 90 minutes. About one in three recoveries result in an arrest.[15]

STOLEN VEHICLE RECOVERY NETWORK

Los Angeles Police Department (LAPD) studied the LoJack system and issued a request for information on September 14, 1988 regarding the feasibility of implementing a stolen vehicle recovery network (SVRN) with the City of Los Angeles. Qualified vendors were requested to provide information about systems currently available which may be used in the implementation of a SVRN.

The following characteristics of the system were identified:

* Ability to accomplish all signaling on a single radio frequency.

* A self-contained unit that may be concealed in a variety of locations on any vehicle. Each unit will be equipped with a set of unique identifying numbers and/or letters which distinguishes it from all other units.

* A tracking device capable of receiving location information from a unit affixed to a vehicle reported stolen.

* An activation system that would interface with the existing California Department of Justice Stolen Vehicle System.

* A computer system containing information identifying all vehicles registered with the SVRN.[16]

The following safeguards were required of the SVRN:

* Every concealed unit shall have a back-up power supply independent of the vehicle battery.

* Only the completion of a stolen vehicle police report may cause a unit to be activated.

* Neither the vehicle owner nor the unit's supplier shall be able to activate the concealed unit.[17]

LAPD received written responses from five companies in response to the request for information. The LAPD staff conducted a preliminary review and determined that two responses were most appropriate for review by a blue-ribbon panel of experts in the various disciplines in the project. These proposals were submitted by METS, Inc. and the LoJack Corporation. The characteristics of each system have been presented in this paper. Both companies have developed locating systems based on radio direction finding (RDF) technology.

Based on the evaluations conducted, the SVRN panel concluded that there is technology available to implement an effective, cost benefit stolen vehicle recovery system. The potential impact of such a system, in the recovery of vehicles and the apprehension of criminals, led the panel to the conclusion that the implementation of the SVRN would be in the best interests of the police department and the citizens of Los Angeles. Additionally, the panel concluded that technology exists to construct the SVRN for Los Angeles County in an open manner that would provide the platform for expansion to include the entire State of California.

The panel concluded that there is nothing inherent in the system architecture, as stated in the RFI, that constitutes a barrier to effective competition by vendors who may decide to enter the market for tracking devices.[18]

The LoJack Stolen Vehicle Recovery System was chosen as the most viable system currently available based on its operational status in Massachusetts and other areas. The remaining research will center around the architecture of the LAPD request for information and the LoJack system. It is recognized that the system will provide a base for study that will hopefully be expanded technologically through competition created to capture a multi-million dollar marketplace. For competition to emerge, a marketplace must be created and workable parameters established to direct researchers.

The LoJack Corporation was formed in 1981 to develop a system for locating stolen cars. In August 1983, LoJack entered into an agreement with Micro Logic, Inc., to provide the design of marketable system components and the development of production technology. The Stolen Vehicle Recovery Network (SVRN) system consists of the following basic components:

* The LoJack unit
* Police tracking computer
* Sector activation system
* Computer network

The LoJack unit consists of four basic parts: a radio receiver, radio transmitter, computer logic, and a hidden antenna. The LoJack unit is concealed in one of several areas in the interior of a vehicle which is usually inaccessible to the occupants of the vehicle. The unit is about the size of a small blackboard eraser. The LoJack unit is designed to draw power from the vehicle's electrical system but is equipped with a back-up battery to power the unit if power from the vehicle is disconnected or is saturated with a high current input.

The receiver within the LoJack unit operates in the high band VHF spectrum. The system was designed to consume relatively small amounts of current so as not to discharge the battery of the vehicle in which it is installed. It is estimated that with an adequately charged vehicle battery and minimal drain upon the electrical system from other sources, the unit could transmit from a parked vehicle for up to a month before draining the battery.

The transmitter contained in the unit operates on the same frequency as the receiver. The transmitter operates at only 200 milliwatt output at its antenna to enhance the likelihood that police vehicles receiving the transmitter's signal will be within range to track and recover the vehicle from which the transmission is emanating.

The computer logic activates the unit's transmitter after receipt of its unique activation code. Each unit has its own unique activation code and a unique reply code, which is different from the activation code for security reasons. The microprocessor within the logic responds only upon receipt of the appropriate code and will generate transmissions designed to be distinguishable from transmissions generated by all other users of the radio channel. Several hundred million unique codes are available for use as activation and reply codes. All transmissions from LoJack units are accomplished in very short bursts separated by relatively long time intervals of variable length. If multiple units are transmitting in the vicinity of each other and are activated, it is unlikely that their transmissions will overlap.

The unit antenna is designed for use in different vehicles. Design of an antenna capable of satisfactory broadcast quality that can be hidden and used within different locations in different motor vehicles is a particularly challenging design problem and continuing efforts to develop antenna designs that will render improved performance is anticipated.

The police tracking computer, intended for use by law enforcement officers to locate activated units within a limited range, are installed in police vehicles and can also be mounted at fixed locations such as toll booths or radio towers. The range at which the units may be detected is expected to vary greatly under different topographical and other conditions from hundreds of yards in certain urban environments to as much as five miles under ideal conditions.

The police tracking computer consists of four basic parts: a phased antenna array, a receiver, a doppler computer and a display module.

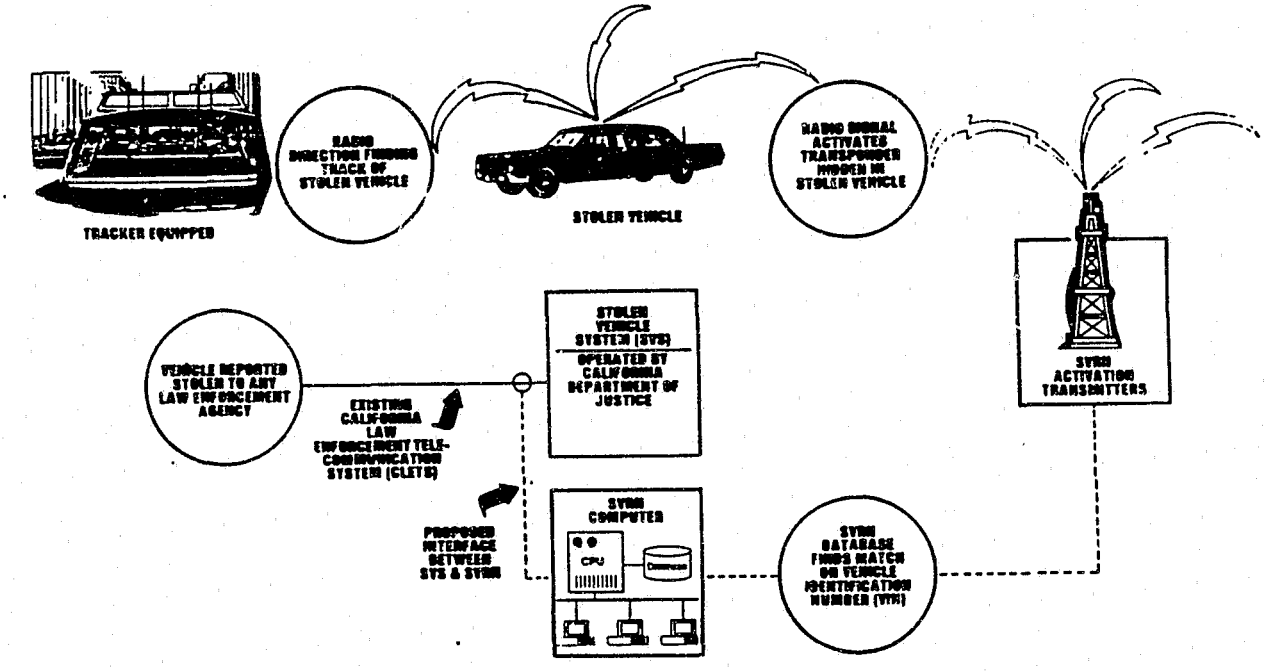
The antenna, which is designed to be mounted on the roof of a police vehicle, consists of four elements that are electronically phased to function like a rotating directional antenna. When a series of signals are received from any activated unit, the doppler computer determines the direction of the signals by analyzing the signals' doppler shift. This information will be displayed on the display module. The display module, which is easily mounted on a car dashboard, consists of a circle of L.E.D.'s used to indicate relative direction, a vertical bar display to indicate relative signal strength (and therefore distance), a five character display to indicate reply codes being received from activated units, a speaker and volume control to listen to incoming signals and a lock-on button. By pressing the lock-on button, the operator can isolate a particular LoJack unit's reply code. Until the lock-on button is released, the display module will display only data pertaining to the selected code. After locking on to the signal from a unit, the operator will notify the dispatcher that he/she has identified an activated SVRN unit and will ask for a vehicle description. After such an inquiry is made, the system computer will automatically transmit a signal to the

unit directing it to transmit its signal more rapidly in order to facilitate the operator's efforts to locate the stolen vehicle.

Sector Activation system. The Sector Activation System consists of three basic parts: a computer system, a transmitter controller and a series of transmitters.

The computer system contains a file of activation codes, reply codes, vehicle descriptions and other data. When a stolen vehicle report is received, the computer system directs the transmitter controller to sequentially activate a series of transmitters in the administrative region in which the vehicle was stolen. The transmitters in use in Massachusetts are commercially available VHF narrow band FM units that operate at approximately 110 watts. The transmitter controller may communicate with the transmitter via microwave, hard wire or telephone lines.[19]

PROPOSED STOLEN VEHICLE RECOVERY NETWORK



Technology is currently available which will assist law enforcement in locating vehicles which have been reported stolen. During the the next three to five years, emphasis will be placed on adapting existing technology to this purpose and measuring the level of interest and commitment among consumers, private industry, and law enforcement. The long range future, the next 5 to 10 years, will hold the potential for modification of the technology to include satellite applications and services to law enforcement which are currently unavailable.

NOMINAL GROUP TECHNIQUE

The Nominal Group Technique (NGT) was selected as a research method to enhance further review of the issue. The NGT uses the combined knowledge and experience of a group of individuals who have diverse experience regarding a common issue.

Ten individuals were selected to form the NGT panel. (See Appendix A for a description of the panel members.) Discussion with the individual panel members prior to the group meeting indicated that each person was familiar with the nature of the proposed stolen vehicle recovery network (SVRN). Degree of familiarity varied from passing knowledge ("I read an article about it") to a full-time job assignment relating to the SVRN. At the meeting, the group briefly discussed the concept of the SVRN and viewed a short video recording of a NBC news report regarding the LoJack system currently operating in Massachusetts. An overview of research completed up to the time of the NGT meeting, as well as the scope of the research project, was provided to the group. The panel was appraised of the steps involved in the Nominal Group Technique.

IDENTIFICATION OF ISSUE TRENDS

The first phase of the Nominal Group Technique was to identify emerging trends which will have impact upon the issue at hand. Trends are a series of occurrences over a period of time. The process of identifying trends commenced with each individual's generating ideas, followed by a round robin recording of those ideas, and discussion of the ideas for clarification. The panel generated 44 trends which will influence the issue at hand. (See Appendix B for a complete list of trends.) The ideas presented by the group identified social, technological, economic, and political trends. In order to identify the trends having the most significant impact on the issue, the group prepared individual ballots. Following the preliminary vote, the 20 items receiving votes were

discussed and a final vote was conducted which identified five trends as having significant influence on the issue.

The five trends identified by the NGT panel which will affect the future of a stolen vehicle recovery network in Los Angeles County are listed below:

1. **The Rate of Motor Vehicle Theft** is the frequency with which the crime occurs. The rate is used in a variety of social and economic settings, including the determination of insurance rates. The group identified the number of vehicles stolen within Los Angeles County as the rate of motor vehicle theft.

2. **The Consumer View of Possibility of Theft** is the degree to which the residents of the county feel that they may be the victim of a motor vehicle theft.

3. **Level of Commitment to the Motor Vehicle Theft Problem** relates to the combined emphasis placed on the issue by government, the insurance industry, law enforcement, the courts, the media and other groups influencing the issue.

4. **Level of Community Involvement** is the degree to which consumers are committed to action to reduce the rate of motor vehicle thefts. The involvement may include purchasing anti-theft devices, participating in awareness programs, or expressing support of actions of other sectors with a common concern regarding the issue.

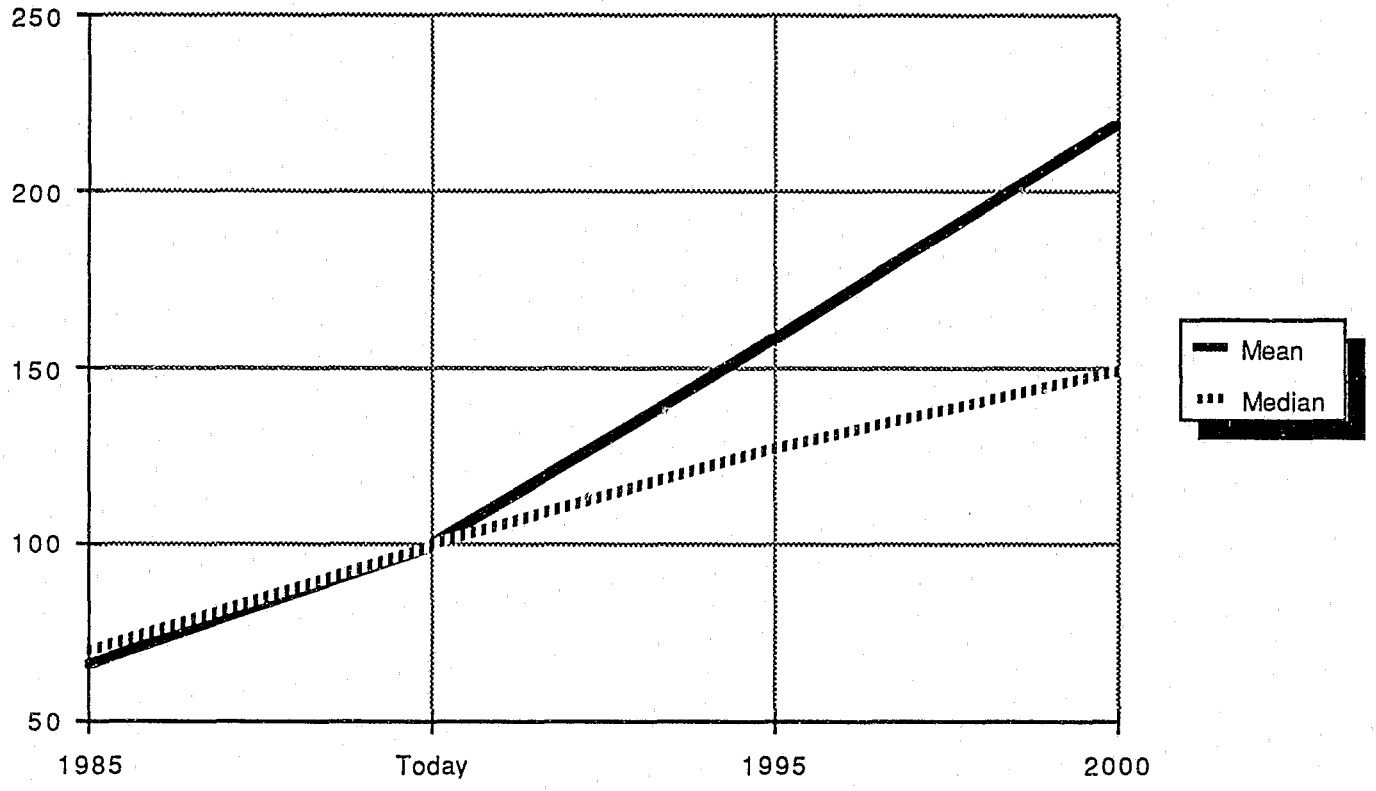
5. **The Rate of Recovery** is the percentage of stolen motor vehicles which are located by law enforcement and returned to the owner.

After identifying the trends, the group was asked to evaluate the level of each trend based on their personal knowledge and the group discussion. Using 100 as the level of the issue today, the group was asked to project the trend in 1985, 1995, and 2000. The group rating of the individual trends are presented in the chart on Page 26. Both the mean and the median scores are displayed, because it was felt that the means may have been skewed by one or two ratings which were significantly higher than the majority of scores submitted by the group. The group rating of the trends and a summary of the discussion regarding each trend are presented on pages 27 through 31.

TREND EVALUATION

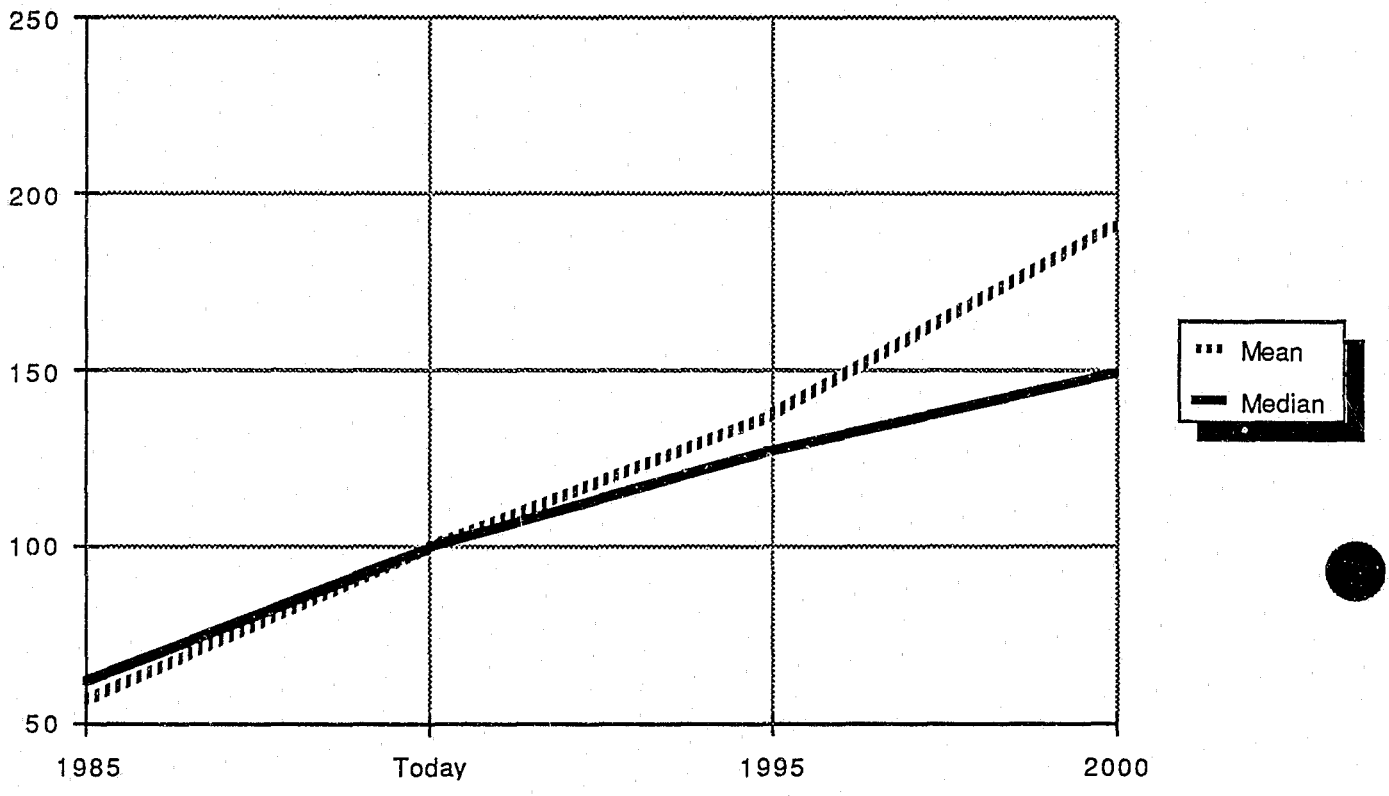
TREND STATEMENT	LEVEL OF THE TREND			
	WAS 1985 MEAN/MEDIAN	TODAY	WILL BE 1995 MEAN/MEDIAN	WILL BE 2000 MEAN/MEDIAN
1. RATE OF MOTOR VEHICLE THEFT	66 / 70	100 / 100	159 / 128	220 / 150
2. CONSUMER VIEW OF THEFT POSSIBILITY	57 / 63	100 / 100	138 / 128	191 / 150
3. LEVEL OF COMMITMENT TO THE MOTOR VEHICLE THEFT PROBLEM	84 / 78	100 / 100	122 / 125	135 / 144
4. LEVEL OF COMMUNITY INVOLVEMENT	60 / 50	100 / 100	112 / 115	139 / 135
5. RATE OF RECOVERY	86 / 85	100 / 100	109 / 100	132 / 100

RATE OF MOTOR VEHICLE THEFT



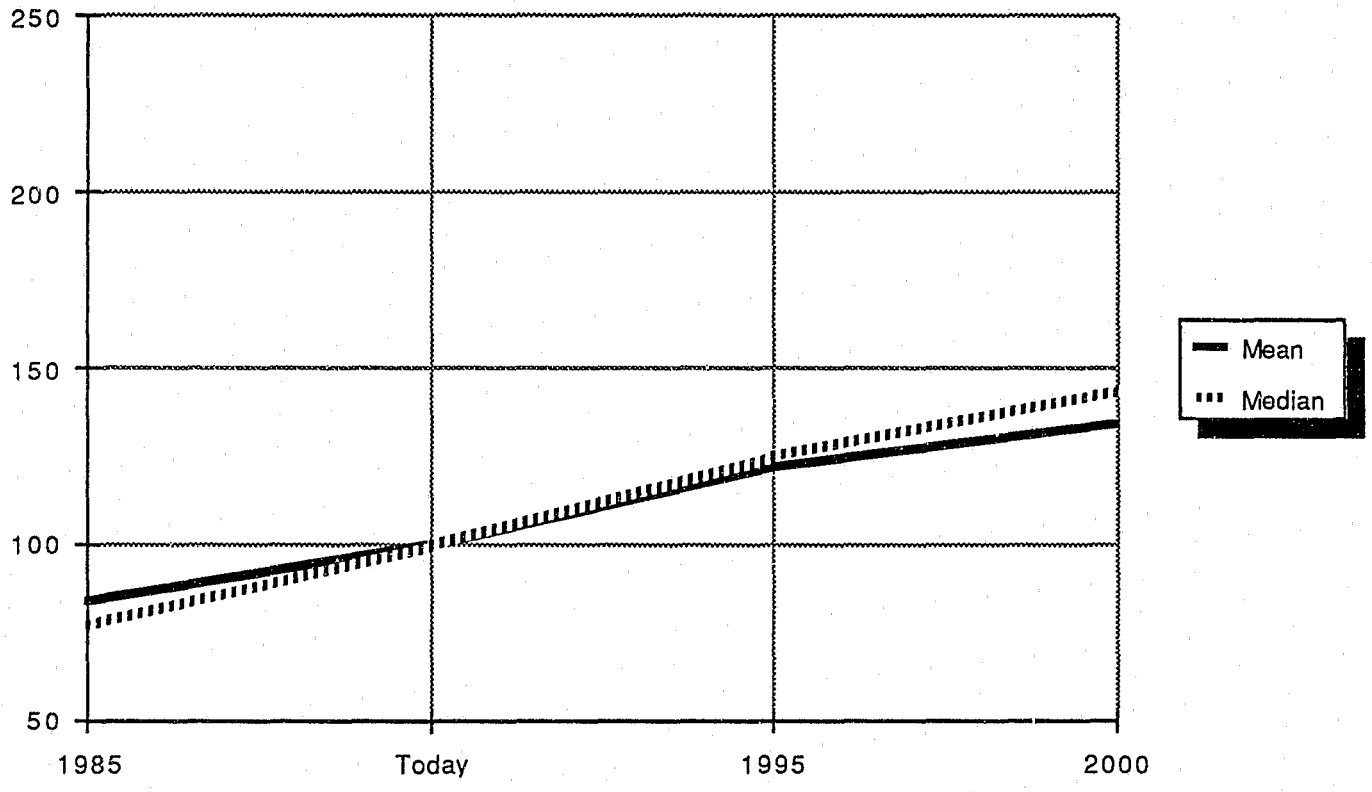
The group felt that the rate of motor vehicle theft would determine, to a large extent, the interest in a stolen vehicle recovery network in Los Angeles County. The county clearly has a motor vehicle theft problem which is affecting the lives of residents through financial loss, intrusion into lifestyles, and increased insurance costs. The group felt that the rate would generate interest in an SVRN that in turn generates a marketplace for technology. The group discussed the social and financial impact of motor vehicle theft on a regional, state, and national level. Nationally, motor vehicle thefts have increased in 27 of the last 31 years.

CONSUMER VIEW OF THEFT POSSIBILITY



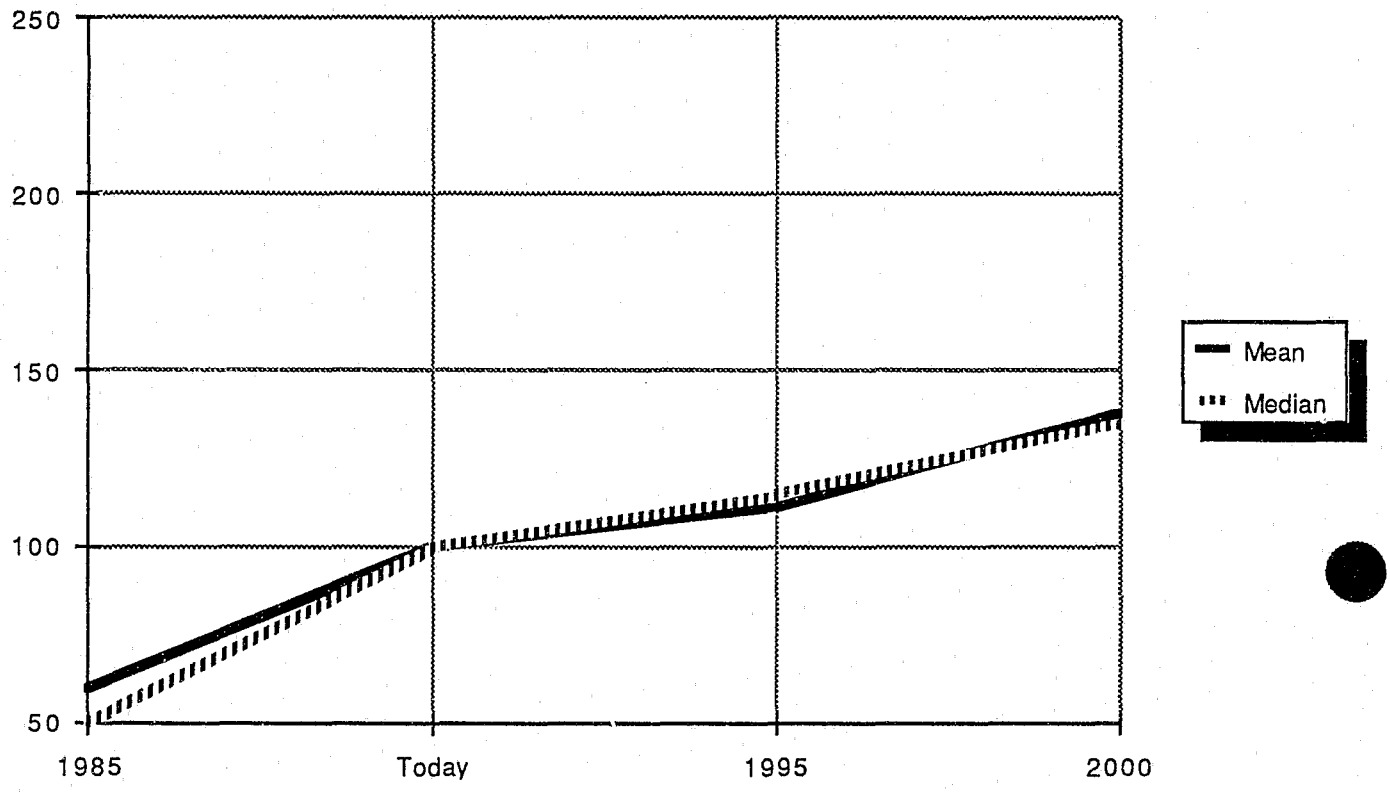
The group felt that the consumer must view the theft of their vehicles as a possibility since they must purchase the transmitter in order to participate in the SVRN. The transmitter, which presently costs about $600, will be more attractive to a person who depends on the vehicle and/or has a high degree of attachment to the vehicle. While opinions may be based on real or perceived risks, the probability of having a vehicle stolen may motivate individuals to participate in the SVRN. It is recognized that other factors such as media coverage, the solving of a spectacular crime as a result of the system, financial incentives (such as a reduction in insurance rates for SVRN equipped vehicles), or a personal interest in technology may motivate participation in the system.

LEVEL OF COMMITMENT TO MOTOR VEHICLE THEFT PROBLEM



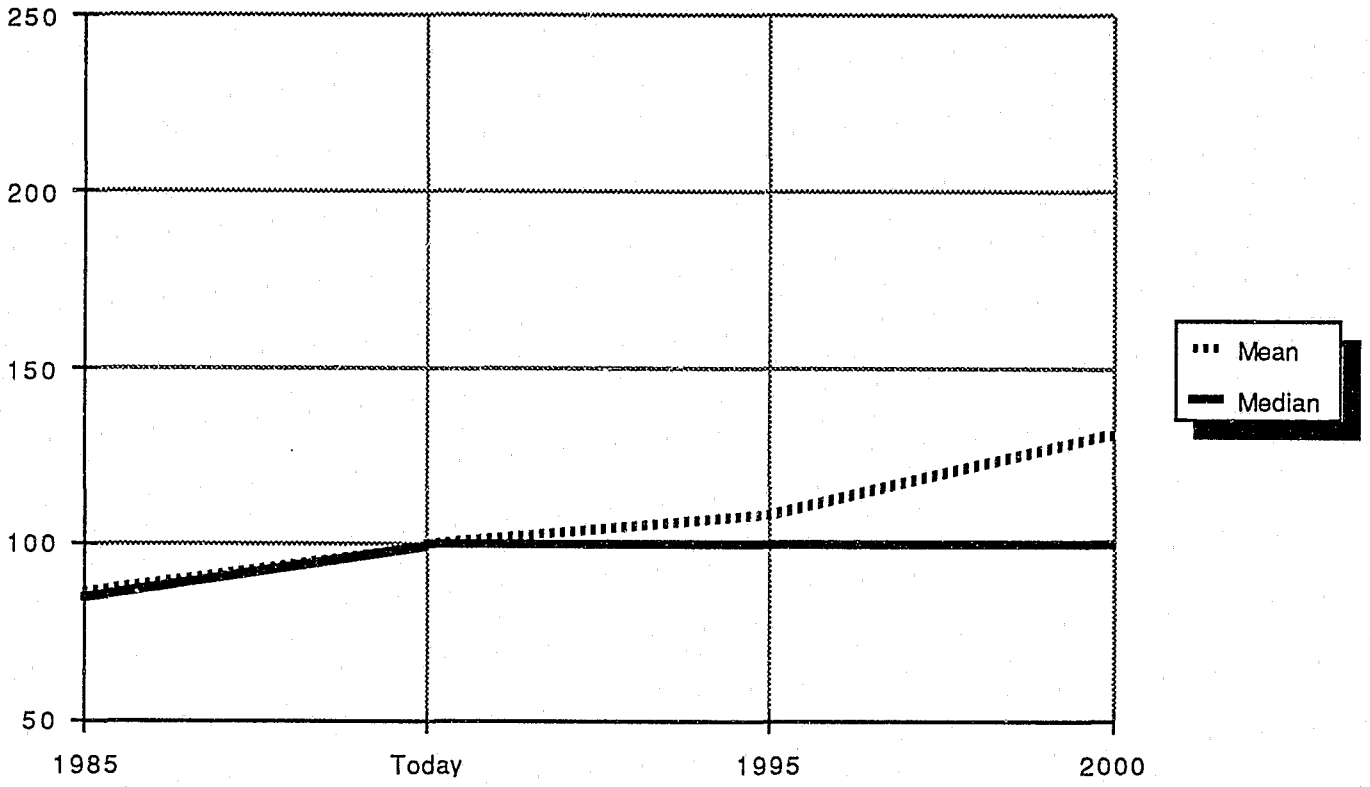
The group felt that the motor vehicle theft problem is an issue that is beyond the control of individual components of the community. The importance of unified commitment among law enforcement, the courts, manufacturers, consumers, the insurance industry, and the media is essential to affect the issue. The group felt the importance of this trend will continue to grow throughout the test and implementation period of the SVRN. This trend is of particular interest to the issue at hand as private industry, the LoJack Corporation, has invested about $10 million developing the SVRN capability in Massachusetts and Florida. Government agencies do not have the financial resources to commit to this level of research and development.

LEVEL OF COMMUNITY INVOLVEMENT



Community involvement will be one of the key elements to the success of the proposed SVRN. Community support of legislation, law enforcement, and the blending of private enterprise with government services is essential to combat the escalating motor vehicle theft rate. Involvement will also entail a financial commitment to participate in the SVRN by purchasing anti-theft transmitters and/or related equipment. In the Boston area, SVRN tracking vehicles are recognized by the community by the four antennae on the roofs of the police vehicles. Local service clubs have raised funds to purchase tracking units which were then donated to their local police departments to help control the motor vehicle theft problem.

RATE OF RECOVERY



The group discussion regarding rate of recovery acknowledged that police currently recover 89 percent of vehicles reported stolen. The experience of the SRVN in Massachusetts had a 98 percent recovery rate for LoJack equipped vehicles which were stolen. Associated with the rate of recovery were the time in which a vehicle was recovered and the condition of the vehicle at the time of recovery. The group felt that accelerated recovery rates and reduced time for recovery for SVRN vehicles would enhance the perception of the system. A second issue relates to a feeling of success that may be experienced by police officers who participate in the recovery of stolen cars. One Boston Police Sergeant has recovered over 50 stolen cars using SVRN technology.

CRITICAL EVENT DEVELOPMENT

The second phase of the Nominal Group Technique was to identify specific events which would impact the issue at hand. An event is distinguishable from a trend by the method of measurement. An event can be measured by a "yes" or "no" response to the question of "Did it occur?"

The group was provided with a description of events in general, then proceeded through the same process as used in the identification of issue trends: individual generation of ideas of writing, round robin recording of ideas, discussion for clarification, a preliminary vote on items, discussion of the preliminary vote, and a final vote.

The NGT panel identified 24 candidate events. (See Appendix C for a complete list of events.) The list was reduced to five events following discussion and the final vote. The NGT panel identified five events which would have a significant impact on the implementation of a stolen vehicle recovery network in Los Angeles County. After careful examination and analysis by the author, it was determined that there was such a high linkage between the items that a beneficial cross-impact analysis could not be conducted. Three of the events identified and rated by the NGT were synthesized into one event (Event 1), and two additional events which had been identified by the NGT were selected for analysis (Events 4 & 5). The five events identified as having a significant impact on the implementation of a stolen vehicle recovery network in Los Angeles County are as follows:

1. **A Stolen Vehicle Recovery Network is established in Los Angeles County on a test basis.**

   A lead law enforcement agency adopts SVRN technology, an interface with the stolen vehicle system is approved, and a radio frequency is allocated.

2. **Public acceptance of the Stolen Vehicle Recovery Network.**

   Consumer purchases of SVRN transmitters reaches 15,000.

3. **Law enforcement commitment to system.**

   Twenty-five law enforcement agencies within Los Angeles County participate in the SVRN and equip 20 percent or more of their patrol vehicles with tracking equipment.

4. **Incentives are adopted.**

   Financial incentives are adopted which make the SVRN transmitters more attractive to the consumer.

5. **The Stolen Vehicle Recovery Network is refined.**

   The SVRN is refined to include satellite capabilities.

After identifying and discussing the five events, the group was asked to estimate the probability of each event occurring. The first estimate indicates the year that the probability of the event occurring first exceeds zero, followed by the probability of the event occurring within five years, and the probability of the event occurring within ten years. The group rating of probability of occurrence of each event is displayed in the chart on page 34.

EVENT EVALUATION

EVENT STATEMENT	PROBABILITY (0-100%)			IMPACT ON THE ISSUE OF A STOLEN VEHICLE RECOVERY NETWORK IN LOS ANGELES COUNTY (-10 THROUGH +10)
	YEAR THAT PROBABLY EXCEEDS ZERO	WITHIN 5 YEARS	WITHIN 10 YEARS	
A STOLEN VEHICLE RECOVERY NETWORK IS ESTABLISHED IN LOS ANGELES COUNTY ON A TEST BASIS	1989	85%	99%	+9
LAW ENFORCEMENT COMMITMENT TO A STOLEN VEHICLE RECOVERY NETWORK	1992	75%	80%	+9
PUBLIC ACCEPTANCE OF A STOLEN VEHICLE RECOVERY NETWORK	1993	65%	70%	+9
INCENTIVES ARE ADOPTED	1994	40%	50%	+7
THE STOLEN VEHICLE RECOVERY NETWORK IS REFINED	1994	10%	40%	+6

During the group discussion of the individual events, the following observations were made regarding the occurrence of each event:

EVENT 1. **A stolen vehicle recovery network is established in Los Angeles County on a test basis.**

The panel discussed the importance of establishing a working SVRN within Los Angeles County in terms of three specific events. These events are the adoption of SVRN technology by a major law enforcement agency within the county, approval of an interface with the existing Department of Justice Stolen Vehicle System, and allocation of a radio frequency on a permanent or experimental basis by the Federal Communications Commission. Each of the three steps are required to establish a SVRN operated by law enforcement on either a test basis or as a permanent program. The ratings of the events in terms of probability of occurrence and the impact of one event upon another prompted the synthesis of the three occurrences into one event.

At the time of the NGT meeting, the LoJack Corporation had presented a proposal to the City of Los Angeles to provide the computer, radio transmitters, and a number of tracking units for police patrol cars to the city for a nominal fee. The city council approved the contract on March 3, 1989. This action met one of the three elements necessary to implement the system. The contract between the City of Los Angeles and LoJack establishes the foundation for a regional program since the radio equipment provides coverage necessary to activate and deactivate transmitters throughout the county. The contract also sets into motion the remaining decision point regarding an interface with the stolen vehicle system. Allocation of a radio frequency by the Federal Communications Commission is currently under consideration.

The panel felt that acceptance of the proposal was vital to the issue as it provides the opportunity to implement the regional SVRN at virtually no cost to local government. The panel also discussed the role that a demonstration test system could play in the implementation of a state-wide SVRN in the future. The contract provides for a three year test period, during which the Los Angeles Police Department has made a commitment to test other systems which may be presented by competing manufacturers. The test period will identify the commitment of law enforcement to the SVRN and will also identify the extent to which consumers will participate in the program.

EVENT 2. **Public Acceptance of the Stolen Vehicle Recovery Network.**

Discussion regarding public acceptance of the SVRN focused on the financial commitment to purchase the transmitter necessary for the consumer's car. It was noted that public response in Massachusetts was slow initially, but it grew as media coverage of the successful recovery of stolen vehicles occurred. As more transmitters are sold, the market becomes more viable for competition in the private sector. It is felt that the sale of 150,000 SVRN transmitters would demonstrate public acceptance of the system.

EVENT 3. **Law enforcement commitment to the stolen vehicle recovery network.**

The panel discussed this event in terms of obtaining financial commitment to purchase tracking for patrol vehicles, training personnel, and rewarding successful application of the SVRN. It is felt that commitment of the region can be measured by the number of law enforcement agencies participating in the program and the number of patrol vehicles that are quipped with SVRN trackers. The participation of 25 agencies with 20 percent of their

vehicles equipped would be an indication of regional commitment. It is recognized that the geographic location of the participating agencies is an important factor in establishing the effectiveness of the regional system.

In Massachusetts, there remains some uncertainty over commitment to purchase tracking units. This situation is being rectified by specifying LoJack equipment as required equipment during the bid process for replacement police cars.

EVENT 4. Incentives are adopted.

The group recognized the incentives which are applied by the insurance industry in Massachusetts. It was felt that the reduction of motor vehicle insurance rates, as they apply to coverage for loss through vehicle theft, would motivate consumers to participate in the SVRN. The insurance incentives in Massachusetts are sufficient to cover the cost of the vehicle's transmitter within 18 to 20 months, based on the average insurance premium. The group recognized the uncertainty of similar incentives in California in the immediate future due to pending litigation directed at voter-imposed insurance premium reductions.

While an incentive based on a reduction in insurance premiums was viewed favorably by the group, other incentives such as use of the transmitters as a sales promotion by specific automobile dealers or increased value at the time of resale could also motivate consumers. The three year test period adopted by the City of Los Angeles coupled with the start-up time for commitment by law enforcement may create a wait and see posture regarding long term incentive programs.

EVENT 5. **The stolen vehicle recovery network is refined to include satellite capability.**

The group recognized that the current SVRN technology is somewhat a "foot in the door". The application of current technology modified for a SVRN is merely the beginning. The application of satellite technology will improve the speed and accuracy of tracking motor vehicles which have been reported stolen. The application of satellite technology will be will be based on the level of acceptance of the SVRN by consumers, the availability of satellite time, and the benefit of such a system to law enforcement.

CROSS-IMPACT ANALYSIS

The occurrence of one event can have an impact on other events. The NGT panel reviewed the events that they had identified as having a significant impact on a SVRN in Los Angeles County and recognized that several of the events would impact on the likelihood of occurrence of other events. By inserting the events on a cross-impact grid, it is possible to estimate the impact of one event upon another. It is also possible to estimate the impact of specific events upon the issue trend identified by the panel.

The events listed on the left side of the grid are referred to as actor events. As such, they are the events which will precipitate changes in the events and trends indicated on the top of the grid, which are referred to as reactor trends and events.

The chart on page 39 reflects the values assigned by the panel and a group of police administrators during the cross-impact analysis. The impact of one event upon another was measured by an anticipated increase or decrease in the probability that the reactor event would occur. Mean scores were used to prepare the ratings. The impact of the events on the trends was also measured.

CROSS-IMPACT ANALYSIS

SUPPOSE THAT THIS EVENT,

WITH THIS PROBABILITY OF OCCURANCE,

ACTUALLY OCCURRED.

HOW WOULD THE PROBABILITY OF THE EVENTS SHOWN BELOW BE AFFECTED?

HOW WOULD THE LEVEL OF THESE TRENDS BE AFFECTED?

		E1	E2	E3	E4	E5	T1	T2	T3	T4	T5
E1	99%	X	INC TO 90%	INC TO 80%	INC TO 55%	INC TO 50%	DEC BY 10%	DEC BY 15%	INC BY 25%	INC BY 15%	INC BY 8%
E2	80%	NO CHANGE	X	INC TO 80%	INC TO 65%	INC TO 65%	DEC BY 10%	DEC BY 5%	INC BY 15%	INC BY 10%	INC BY 5%
E3	70%	NO CHANGE	INC TO 95%	X	INC TO 70%	INC TO 65%	DEC BY 10%	DEC BY 15%	INC BY 15%	INC BY 15%	INC BY 5%
E4	50%	NO CHANGE	NO CHANGE	INC TO 90%	X	INC TO 70%	NO CHANGE	NO CHANGE	INC BY 20%	INC BY 20%	INC BY 5%
E5	40%	NO CHANGE	INC TO 60%	INC TO 80%	INC TO 75%	X	DEC BY 25%	DEC BY 30%	INC BY 20%	INC BY 30%	INC BY 10%

NOTE: INC = INCREASE; DEC = DECREASE

EVENTS

E1 A STOLEN VEHICLE RECOVERY NETWORK IS ESTABLISHEDIN LOS ANGELES COUNTY ON A TEST BASIS

E2 LAW ENFORCEMENT COMMITMENT TO A STOLEN VEHICLE RECOVERY NETWORK

E3 PUBLIC ACCEPTANCE OF A STOLEN VEHICLE RECOVERY NETWORK

E4 INCENTIVES ARE ADOPTED

E5 THE STOLEN VEHICLE RECOVERY NETWORK IS REFINED

TRENDS

T1 RATE OF MOTOR VEHICLE THEFT

T2 CONSUMER VIEW OF THEFT POSSIBILITY

T3 LEVEL OF COMMITMENT TO THE MOTOR VEHICLE THEFT PROBLEM

T4 LEVEL OF COMMUNITY INVOLVEMENT

T5 RATE OF RECOVERY

The conclusions reached as a result of the cross impact analysis are listed below:

EVENT 1: **A stolen vehicle recovery network is established in Los Angeles County on a test basis.**

A Beta test site for a SVRN has a strong effect on each of the four remaining events. Since the test program is the foundation for each of the events, Event 1 increases the probability of each event. The group felt that there was a high probability that Event 1 would occur.

EVENT 2: **Public acceptance of the stolen vehicle recovery network.**

Public acceptance can be gained only if there is a system to accept. This event has no impact on Event 1, although it may impact decisions to retain or discontinue the SVRN in the future. Public acceptance and law enforcement commitment will progress simultaneously during the initial phase of the program and will increase the likelihood of commitment as the number of participants increases. The occurrence of Event 2 would have an impact upon the adoption of incentives since strong consumer support may prompt support for insurance benefits and cause local automobile dealers to use dealer level incentives to boost the sale of their product line. Public acceptance will increase the probability of Event 5, the SVRN is refined.

EVENT 3: **Law enforcement commitment to the system.**

Law enforcement commitment, as defined, would occur after Event 1, so there would be no impact. Event 3 will have an impact upon public acceptance due to the number of people who rely on advice from the local police department regarding crime prevention techniques. Event 3 was not viewed as a

significant influence upon the issue of incentives, but was viewed as a strong impact upon the refinement of the SVRN.

EVENT 4: **Incentives are adopted.**

Event 4 will occur, if at all, after a SVRN is established. The adoption of incentives would have a strong influence on Event 2 (public acceptance of the SVRN).

EVENT 5: **The stolen vehicle recovery network is refined.**

Event 5 will not impact Event 1 due to the projected probability of occurrence within the next 10 years. Event 5 will impact each of the remaining events.

SCENARIOS

Information gathered from the NGT through identification of issue trends, critical event development, and cross-impact analysis was used to prepare three scenarios. Each scenario is a short story which provides a description of a potential of the impact of a stolen vehicle recovery network in Los Angeles County within the next 10 years.

AN EXPLORATORY LOOK

Karen knew that her Hyundai Excel was the top car on the High Theft Vehicles chart when she purchased it, but it was the nicest car that she could afford. Commuting to work each day required a car that provided economy and comfort. Karen pulled into the parking garage downtown just as she did five days a week, week after week. Five o'clock couldn't come soon enough. She thought of the errands to run and chores to complete as she walked briskly to her car or, should we say, to where her car had been before it was stolen. At first she thought that maybe she was mistaken about the spot where she had parked, but Karen realized the truth: she was the victim of an auto theft. Other people at the office had had their cars stolen, but the structure seemed like such a safe place to park. After a quick phone call to the police department, an officer was on the way to take the GTA report. After supplying the basic information, make color, license number, and registration information, Karen was assured that an investigator would call her "in a day or so".

Time passed slowly for Karen as she waited to find out what would happen about her car. The investigator had called, but he didn't have much to offer. Several cars had been stolen from the parking structure during the past months and most of them turned up in a few weeks. Meanwhile, Karen was driving a rented car and waiting to settle her claim with her insurance company, but that required a wait of 30 days. Wasn't there a way to find stolen cars? She had heard of a major police department that was trying to implement a system to track cars, but she didn't know what ever happened to that idea. The news program had talked about conflict with a state agency or some competitor, or something. Anyway, she didn't

have a way to find her car other than wait and see if the police found it or someone called to report it as abandoned. Who knows, someone could have switched the license plates and could be driving it every day. Thoughts of liability and someone using her car to commit a crime were frequent visitors to Karen's mind.

A little over two weeks after the theft, Karen was called by the investigator and notified that her car had been found. It had sat for most of the time in the parking lot of a 24 hour market. The employees of the market called the police after the car had been noticed at the store by a night crew. A check of the odometer showed that the car had been driven a couple hundred miles, then abandoned at the market.

Karen was happy to get her car back, and the damage was rather minimal. She wondered where it had been and who had used it. But now there were details to handle: return the rental car; contact the insurance company; try to get the Hyundai cleaned up. There must be a better way to find stolen cars. If auto theft is one of the most frequent crimes in the state, why isn't someone doing something about it?

A NORMATIVE OUTLOOK

Ed Summers glanced out the side window of the vanpool bus towards the Park-N-Ride lot. His Toyota 4X4 wasn't in its usual spot in the shade of the freeway off-ramp. At first he tried to assure himself that Jodi must have swapped vehicles with him for some reason, but he knew that his wife needed the sedan today to get the kids to T-ball practice and dance lessons. Besides, he had already looked around the lot and had not seen the other car. A quick check of the lot brought reality home as he saw the tell-tale traces of safety glass where the driver's door had been a few hours earlier. Ed half trotted across the street to the convenience store to make two quick phone calls. The first was to Jodi to find out that she still had the sedan and if she could come down and pick him up. The second was to the police department to report his truck as stolen.

Ed was fast to tell the officer that he had bought one of the "stolen car transmitters" for his truck because he knew that Park-N-Rides have a lot of stolen car incidents. The officer took the standard information from Ed: names, dates, times, and the license number of the truck. "Isn't there more that you need to know?" asked Ed. "No, since you have a SVRN transmitter, the computer will do the rest. If things go as usual, you'll have your truck back sometime during the night," the officer replied.

Reassured that the vehicle would be entered into the state's automated stolen vehicle system immediately, Ed, Jodi, and the kids left for home and a dinner that was a little later than normal.

The reporting officer responded to the records division so that the stolen vehicle entry could be made as soon as possible. The entry would activate the SVRN transmitter in Ed's truck to allow tracking by law enforcement agencies throughout the region. Following a trial phase in Los Angeles County, the entire state had become involved in the SVRN. Allocation of a nationwide frequency had allowed law enforcement to concentrate on locating stolen vehicles with tracking units in the patrol vehicles which had been provided through a mix of grant, community, and private industry funding. The officer knew the importance of activating the transmitter as soon as possible to minimize the opportunity for theft of vehicle parts or the use of the vehicle in a more serious crime.

Once the entry was made, the search for Ed's truck became a waiting game. How long would it take for a SVRN-equipped police car to come within range of the transmitter?

About two hours would pass before the tracking unit in Officer John Sloan's patrol car picked up the repetitious beep-beep-beep-beep of a SVRN transmitter. He glanced at the face of the tracker and saw the identifier: 6F0909. A quick radio inquiry revealed that he was tracking the truck reported stolen earlier by Ed almost 50 miles away. Sloan watched the LED compass on the tracker and moved towards the area indicated. An assisting unit that was also SVRN equipped helped reduce the search area by approaching from the opposite direction. Sloan's

inquiry had sped up the transmission rate of the SVRN unit and had also provided all the information from the stolen vehicle report needed to identify the vehicle. Sloan had received his tracking training at an advanced officer training course and enjoyed the chance to hunt down a stolen car and, when lucky, catch the person who stole it. The trackers led Sloan and his assisting unit to a parking lot at the mall. A few more minutes and they had the truck in sight. Due to the location and the relatively short time since the theft, the patrol sergeant decided to have a detective unit watch the truck for an hour to see if anyone would return to it. If they could get someone in the stolen vehicle, there would be a good probability of a criminal filing due to the emphasis the District Attorney's office placed on auto theft cases.

An hour passed with no activity, so Sloan moved back into the parking lot. A quick examination revealed a broken window, a punched ignition, and a missing stereo system. Sloan asked the dispatcher to notify Ed so that he could pick up his truck. While he was waiting, Sloan gathered some fingerprints for the lab boys to send through the CAL-ID system. If you can't catch them one way, maybe another will work!

Ed was happy to get his truck back right away. He was not forced to go without a second vehicle, nor did his truck sit someplace for several days waiting to be noticed by the police or someone else. His investment in the SVRN transmitter had paid off. Sloan's training had also served its purpose in helping the officer to "Protect and Serve."

The SVRN was firmly in place statewide, but was constantly undergoing upgrading. The active participation of the community and businesses associated with the auto industry had created a market which warranted investment in research and development from the private sector. Who knows where this thing might go? Some folks are even talking about leasing time on a satellite and attempting to locate stolen vehicles from space.

A HYPOTHETICAL FUTURE: Officer Diane Freeman walked briskly from the apartment complex to her patrol car with her lap top crime incident recorder in her hand. She had just completed a stolen vehicle report and

was anxious to see if the vehicle was still in her patrol area. The screen of the Mobile Digital Terminal was blank as she slid behind the steering wheel. "Great! No assignments while I was out. Maybe I'll get lucky with this one." Diane plugged the lap top into the MDT and tapped the transmit button. While the report was being transmitted to central records, Diane's thoughts drifted to the stolen vehicle recovery network. The car which had just been reported stolen was equipped with a SVRN transmitter which could be tracked by the state-operated satellite anywhere in the United States. An older system which used land-based tracking devices was just being phased out when Diane entered the police department. Strong consumer interest in self protection and an escalating motor vehicle theft problem had created a market for a satellite system jointly operated by the state and private enterprise. Diane had only heard stories of the times when stolen vehicles were located mainly by chance, when officers ran the plates of suspicious vehicles or those which looked out of place to see if they were stolen. Those were the days before even the primitive tracking devices.

Three quick chirps from the MDT alerted Diane to her next assignment. "911-C - meet the manager - juvenile shoplifter in custody." Well, some things never change. A tap on the acknowledge key let communications know that she was on the way as the black and white moved slowly into the rush hour traffic towards the address provided on the screen. 9L20 was on her way, but at a snail's pace in the rush hour traffic in the central city. Her thoughts drifted back to her GTA report and the pending GTA ACE award she was so close to getting. The police department recognized those officers who could recover 100 stolen vehicles in a year as Aces. Diane only needed two more recoveries to get this award for the first time.

Once again, chirps from the MDT alerted Diane to an assignment. As soon as she saw the screen she twisted the audio knob higher so that she wouldn't miss a word from communications. "A GTA just reported, westbound in the 1200 block west Hilltop. 9L20 standby on your prior assignment and handle the GTA recovery. 9L20, your vehicle is a '94 Ford Probe, silver in color, California License 9ROG992." Diane was the closest patrol car to the GTA. Hilltop and Warner intersected just a

few blocks North of her current position. "Well, someone else got my stolen, but this one'll put that ACE pin just one car away." An assisting unit was dispatched to assist in the arrest and was moving through commuter traffic towards the area of Warner and Hilltop. Diane switched the MDT to the mapping function and was able to see the positions of her unit, the assisting unit, and the rolling stolen.

Diane arrived at Warner and Hilltop before the stolen vehicle and pulled into the left turn lane. Sitting through the green phase thoroughly irritated the drivers behind her, but it would put her behind the car she was tracking. As the Probe passed through the intersection, Diane could see that there was only one person in the car. The assisting unit was in position, so Diane moved in behind the stolen and confirmed the stolen status of the car. "9L20, disable 9ROG992." The dispatcher knew the command would be coming and undoubtedly had entered the command and sought supervisory approval before Diane had sent her instructions. "9L20 - vehicle disabled." The Probe coasted to a stop, the engine had been turned off and the electric door locks engaged by one of the refinements of the SVRN - implemented when the system was shifted to the satellite. Additional FCC frequency allocations had allowed the system to be expanded to provide "insurance" against pursuits which too often had ended in collisions.

As she drove to the custody center with her prisoner, Diane saw that her assisting unit had been dispatched to handle her shoplifter call. Too bad, she thought, but the important thing for now was that a car was on its way back to the owners, a car thief was going to jail, and she only needed one more GTA to be an ACE.

PART TWO - THE STRATEGIC PLAN

The development of a strategic plan to enhance law enforcement's ability to locate stolen vehicles in Los Angeles County.

THE STRATEGIC PLAN

The normative scenario describes the immediate future, the next three to five years, in terms of implementing existing technology, as well as introducing the long range potential of a SVRN. Technology is currently available to implement the system portrayed in the scenario; however, modifications of technology, support at various levels, and various government approvals are required to activate the stolen vehicle recovery network. The strategic plan brings to reality a future which is desirable and obtainable.

SITUATIONAL ANALYSIS

Literature scanning, personal interviews, and the observation of a functioning stolen vehicle recovery network in Boston, Massachusetts, revealed that changes in the manner in which stolen vehicles are located would benefit law enforcement and the residents of Los Angeles County. The first step in developing a strategic plan necessary for implementing a stolen vehicle recovery network is the completion of an environmental assessment and the identification of internal capabilities and resources.

ENVIRONMENTAL ASSESSMENT: An environmental assessment identifies the threats and opportunities related to the issue of the impact of a stolen vehicle recovery network in Los Angeles County.

Opportunities which were identified include the following:

* An increasing rate of vehicle theft which may make motorists in the region more receptive to adopting the system in order to recover their vehicle if it is stolen.

* An increasing value of vehicles and their component parts which makes vehicles of varying price levels attractive targets for theft. The motor vehicle theft problem is not restricted to the wealthy.

* Environmental conditions which provide for a longer expected life term of motor vehicles.

* A regional focus on crime problems and the impact of crime on society.

* A favorable image of law enforcement and support for the efforts of agencies throughout the region as it relates to crime prevention and general law enforcement.

* A stable economy due to a diverse mix of manufacturing, service, and research interests.

* Travel by private vehicle appears to be the preferred mode of travel by a substantial portion of the population.

* A high level of acceptance on the part of consumers for electronic devices such as alarms and automated business equipment.

* The proposed system is capable of working with other devices, such as intrusion alarms, and devices which disable the vehicle.

* Competition for an economic market motivates research, refinement of technology, and may reduce costs.

Threats which were identified include the following:

* The proposed system becomes operational after a theft has occurred, which may deter some consumers from purchasing the system.

* Consumers may choose between competing protective systems rather than purchasing a combination of systems.

* A high degree of regulation restricts competition and may affect pricing.

* Competition among vendors may influence consumer trust in the system.

INTERNAL CAPABILITIES AND RESOURCES: An assessment of internal capabilities and resources focuses on the strengths and weakness within law enforcement in Los Angeles County that will affect the impact of a stolen vehicle recovery network.

Strengths which were identified include the following:

* A history of good working relationships between the various agencies.

* Well-developed communications through various professional organizations and management groups.

* A reputation of innovation and creativity in addressing law enforcement situations.

* Well defined training for officers attending the basic academy and advanced officer courses.

* Adequate resources in terms of equipment.

* High quality personnel available to assist in the design, testing, training of personnel, and implementation of a SVRN.

Weaknesses which were identified are listed as follows:

* View by many law enforcement personnel that vehicle theft is merely a property crime.

* Potential for competition for resources necessary to equip law enforcement vehicles.

* Position of individual agencies with high vehicle theft rates may be viewed as self serving.

* Varying levels of commitment may leave gaps in the network, allowing stolen vehicles to remain undetected.

* The independent cities within the county will need to compete on a local level for financial support to equip their patrol vehicles, creating a staggered time line for implementation.

* Agency policies may vary extensively regarding tracking of a stolen vehicle after it leaves the jurisdiction of the tracking officer.

The identification of a weakness, opportunity, threat, or strength of a situation may vary due to the perception of the issue by an individual or an agency. While one agency may view any of the above items as a weakness, another may view the item as a strength due to a different perspective of the issue. With these weaknesses, opportunities, threats, and strengths in mind, it becomes possible to identify those persons who have a vested interest in the issue at hand.

STAKEHOLDER IDENTIFICATION AND ANALYSIS

A stakeholder is an individual, group, or organization who has a vested interest in the issue. It is essential in the development of a strategic plan to identify the stakeholders and recognize their opinions or assumptions as they relate to the issue at hand. Sometimes, a stakeholder will hold an opinion which may not be obvious on the surface. The term "snaildarter" is associated with this stakeholder. The stakeholders and their underlying assumptions regarding the issue of the impact of a stolen vehicle recovery network in Los Angeles County are as follows:

1. **LOS ANGELES POLICE DEPARTMENT**

   A. Will support implementation of a SVRN on a test basis
   B. Will support development of a regional SVRN
   C. Will actively seek the support of state and federal agencies to gain required approvals to implement the SVRN

2. **LOS ANGELES COUNTY SHERIFF'S DEPARTMENT**

   A. Will support implementation of the SVRN on a test basis
   B. Will assist in technical development of a regional SVRN

3. **CALIFORNIA HIGHWAY PATROL**

   A. Will support implementation of a SVRN on a test basis
   B. May desire to be come lead agency in a regional or statewide program

4. **DEPARTMENT OF JUSTICE**

   A. Will remain neutral regarding implementation of a regional SVRN
   B. Will require contracts and fees for service to protect integrity of department
   C. Will desire input on operation of interface equipment and procedures

5. **FEDERAL COMMUNICATIONS COMMISSION**

   A. Will remain neutral regarding the implementation of a regional SVRN
   B. Will require input regarding the allocation of a frequency dedicated to a SVRN
   C. Will base decisions on technical merit

6. **LOS ANGELES COUNTY POLICE CHIEFS**

A. May feel that unfair advantage was provided to Los Angeles Police Department in the distribution of tracking units from the distributor

B. May view motor vehicle theft and associated crimes as "a big city problem"

C. May unite to seek distribution of additional tracking units or seek state legislation to allocate funds for tracking units

7. **VEHICLE SECURITY VENDORS**

A. May view system as monopolistic

B. May feel that a SVRN will infringe upon market area for their products

C. May oppose implementation of SVRN at any level and oppose supporting legislation which provides funds for equipment

8. **MOTOR VEHICLE DEALERS**

A. Will recognize sales potential through the marketing of SVRN transmitters to consumers

B. May resist participating in sales due to a feeling that consumers would resist the product initially

9. **POLICE OFFICERS**

A. Will be apprehensive about the effectiveness of the SVRN initially

B. May become disillusioned at first due to low numbers of transmitters in stolen vehicles

C. May develop frustration if adequate tracking devices are not available when number of successful trackings increase

10. **CONSUMERS**

A. Will be curious about the operation of the SVRN equipment

B. Will participate in the SVRN if perceived threat of becoming a victim is high

C. May become "trendy" to participate in the SVRN

D. Will seek marketing, financing, and installation which is convenient and prompt

E. May be wary of the ability of the police to track the location of vehicles and fear abuse of the technology

11. **INSURANCE INDUSTRY**

A. Will take a "wait and see" posture before offering incentives

B. Will view the SVRN as a resource to reduce the financial impact of motor vehicle theft

C. Will assist in promoting regional program

12. **SATELLITE COMPANY**

A. Will assist in design of technology if sufficient consumer and law enforcement commitment is demonstrated

B. Will view a regional SVRN as a "stepping stone" to state and national systems

13. **STOLEN VEHICLE RECOVERY NETWORK MANUFACTURER**

A. Will provide equipment necessary to initiate SVRN in appropriate market areas

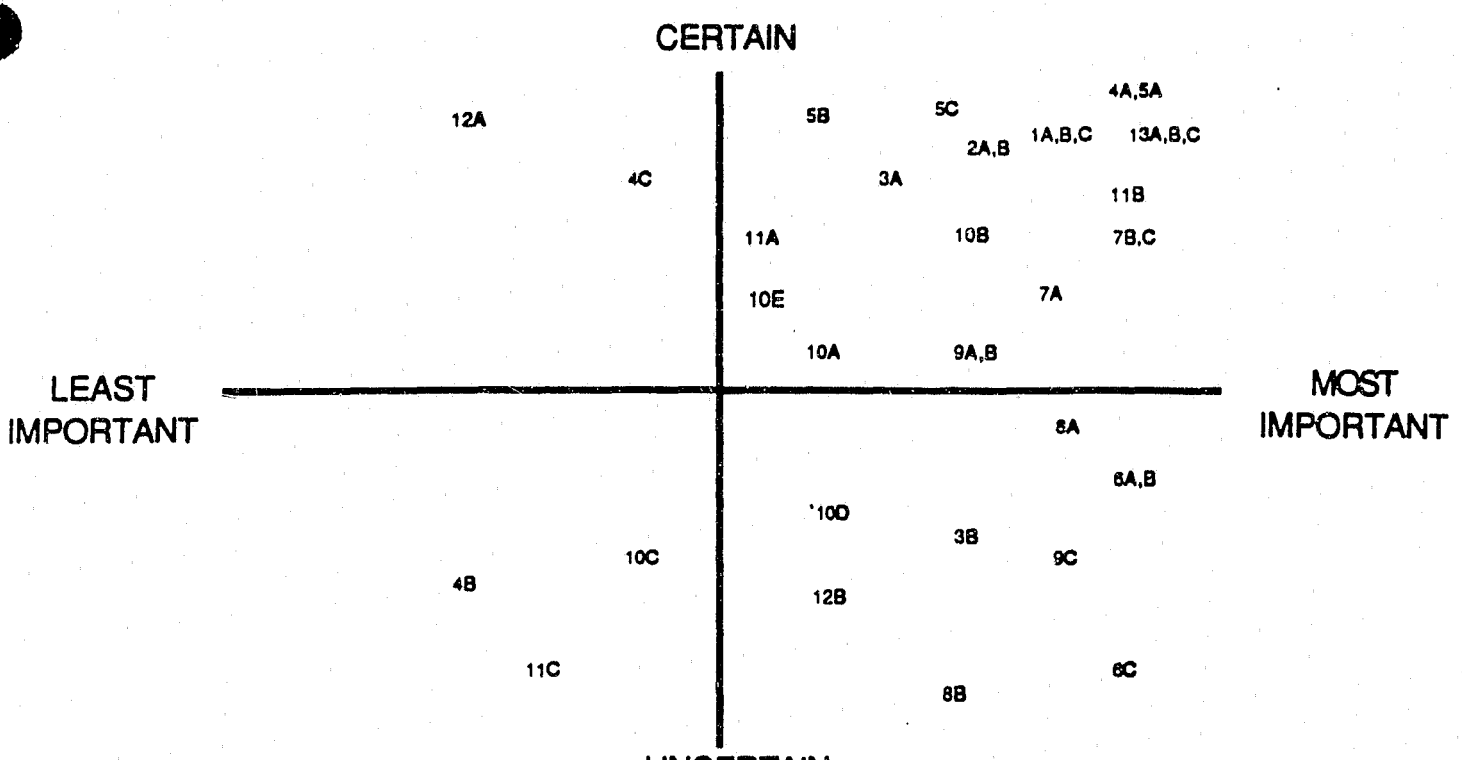
B. Believes that a market for SVRN products exists in both the consumer and law enforcement areas

C. Recognizes a potential for profit through a successful SVRN in appropriate market areas

The snaildarter associated with the issue appears to be the vehicle security vendors. While individual firms may hold divergent opinions, a

substantial front of opposition to the SVRN has emerged from the vehicle security arena. It would appear on the surface that the two systems, a preventive alarm and the SVRN transmitter, would be complementary features, but the battle lines appear to be emerging early in the project. The position of the stakeholders in terms of importance to the issue and the degree of certainty or uncertainty of their support regarding a regional stolen vehicle recovery network are displayed in the chart on page 57.

STAKEHOLDER EVALUATION



STAKEHOLDERS AND THEIR ASSUMPTIONS

1. Los Angeles Police Department
   A) Support implementation of a SVRN on a test basis
   B) Support development of a regional SVRN
   C) Actively seek the support of state and federal agencies

2. Los Angeles County Sheriff's Department
   A) Support implementation of the SVRN on a test basis
   B) Assist in technical development of a regional SVRN

3. California Highway Patrol
   A) Support implementation of a SVRN on a test basis
   B) Desire to become lead agency regional or state wide

4. Department of Justice
   A) Remain neutral regarding implementation of SVRN
   B) Require contracts and fees for service
   C) Desire input on operation of interface equipment and procedures

5. Federal Communications Commission
   A) Remain neutral regarding implementation of SVRN
   B) Require input regarding allocation of frequency dedicated to a SVRN
   C) Base decisions on technical merit

6. Los Angeles County Police Chiefs
   A) May feel unfair advantage was provided to L.A.P.D. in distribution of tracking units from the distributor
   B) May view motor vehicle theft and associated crimes as big city problem
   C) May unite to seek distribution of additional tracking units or seek state legislation to allocate funds for tracking units

7. Vehicle Security Vendors
   A) May view system as monopolistic
   B) May feel that SVRN will infringe upon market area for their products
   C) Oppose implementation of SVRN at any level and oppose supporting legislation which provides funds for equipment

8. Motor Vehicle Dealer
   A) Recognize sales potential of marketing SVRN transmitters to consumers
   B) Resist participating in sales due to consumer's initial resistance

9. Police Officers
   A) Will be curious about the operation of the SVRN equipment
   B) Disillusioned at first due to low numbers of transmitters in stolen vehicles
   C) May develop frustration if adequate tracking devices are not available when number of successful trackings increase

10. Consumers
   A) Will be curious about the operation of the SVRN equipment
   B Participate in the SVRN if perceived threat of becoming a victim is high
   C) Become trendy to participate in the SVRN
   D) Seek convenient and prompt marketing financing and installation
   E) May have concern over privacy issues

11. Insurance Industry
   A) Take a wait and see posture before offering incentives
   B) View the SVRN as a resource to reduce the financial impact of theft
   C) Assist in promoting regional program

12. Satellite Company
   A) Assist in technology if consumer and law enforcement commitment is demonstrated
   B) View regional SVRN as "stepping stone" to state and national systems

13. Stolen Vehicle Recovery Network Manufacturer
   A) Provide equipment necessary to initiate SVRN in appropriate market
   B) Market for SVRN products exists in consumer and law enforcement areas
   C) Recognizes a potential for profit through a successful SVRN

MISSION STATEMENTS

A mission statement presents the purpose of an organization and its components. The statement identifies the services provided to the constituency. The mission statements of Law Enforcement in general, and of the Stolen Vehicle Recovery Network in particular, are as follows:

The Mission of law enforcement is to protect life and property; to maintain order; to enforce the law fairly and equally without regard to race, religion, or sex; to identify and arrest those persons responsible for criminal behavior; and to recover the property of victims while respecting the constitutional rights of all persons.

The Mission of the stolen vehicle recovery network is to enhance the ability of law enforcement agencies in Los Angeles County to locate and recover stolen vehicles; to reduce the financial impact of vehicle theft within the county; and to identify, arrest, and aggressively prosecute those individuals or groups responsible for motor vehicle theft.

EXECUTION

A series of discussions were held with management and command level law enforcement officers as well as a respected management consultant in order to develop alternative strategies to address the future of a stolen vehicle recovery network in Los Angeles County. The strategies identified are listed below:

1. **SINGLE AGENCY LEAD:** A single law enforcement agency assumes responsibility for the research, development, and implementation of a SVRN in their jurisdiction.

2. **JOINT POWERS AGREEMENT:** A formal contractual agreement is established between multiple jurisdictions within a specified region to provide a management structure and funding for a SVRN to serve the contracting agencies.

3. **FORMATION OF A QUASI GOVERNMENT NONPROFIT ORGANIZATION:** A nonprofit organization is formed to implement a SVRN, market the necessary equipment, and equip law enforcement vehicles with tracking equipment.

4. **CONTRACT FOR SERVICES:** A contract is authorized granting marketing privileges and establishing service requirements upon the selected vendor. A variety of requirements and conditions may be established as a condition of granting the contract.

5. **INDEPENDENT AUTONOMOUS AGENCY:** A law enforcement agency is established solely for the purpose of investigating stolen vehicles and implementing a SVRN for their use towards that responsibility.

6. **LEAD AGENCY/REGIONAL TEAM:** A law enforcement agency assumes a lead position in synthesizing the capabilities and resources of agencies throughout the region as they relate to the recovery of stolen vehicles.

An evaluation of the feasibility and desirability of each of the alternatives was conducted. Three strategies were chosen for further evaluation to allow selection of a recommended strategy. The strategies selected are as follows:

ALTERNATIVE ONE; SINGLE AGENCY LEAD: A law enforcement agency within the region assumes a leadership position regarding the issue and dedicates personnel and resources necessary to research, implement, and evaluate a stolen vehicle recovery network. In a single lead agency setting, the agency which assumes the lead position will develop a program which meets the needs of the agency and the constituency which it serves. Research, design, implementation, testing, and evaluation of programs are conducted under guidelines of the agency, frequently by personnel of the agency. The advantages and disadvantages of a single agency lead strategy are as follows:

PRO: Clearly defined areas of responsibility, accountability, and time lines

PRO: Commitment of finances, personnel, and other resources is determined at the onset of the project

PRO: Avoids duplication of effort and provides for clear definition of the desired end product

PRO: Areas of opportunity and threats to the project are easier to identify

CON: Project may be identified as "their program" by other agencies in the region

CON: Project architecture may be biased by the policy and procedure of the single agency

CON: Project may fail as a result of a necessity to allocate resources to another department priority

CON: Loyalty and responsiveness of other parties involved in the project may be directed at the lead agency rather than other participants

STAKEHOLDERS PERCEPTIONS: A single agency lead provides the mechanism for agencies participating in decision points (Department of Justice, Federal Communications Commission and SVRN manufacturers) to deal with one agency which will be an asset. The single agency process also establishes a focal point for those groups in opposition to the SVRN or portions of the implementation process. While the structure may not alter the identified assumptions, it does provide an accessible forum for information and accountability. The single agency lead may bond resistance from other law enforcement agencies due to a "us and them" viewpoint.

ALTERNATIVE TWO; LEAD AGENCY/REGIONAL TEAM: A law enforcement agency assumes a lead position in the formation of a regional team comprised of law enforcement leaders and technicians to research, implement, and evaluate a stolen vehicle recovery network. The lead agency/regional team concept establishes a format where the lead agency coordinates the efforts of agencies involved in the SVRN to avoid duplication of effort. Participating agencies are represented in various phases of development and evaluation. A governing board of command officers oversees the operation of the SVRN, seeks resources necessary to implement and expand the regional commitment, and develops policies to prevent conflict or uncertainty. Technical subcommittees resolve the day to day working issues. The advantages and disadvantages of a lead agency/regional team strategy are listed below:

PRO: Evaluates commitment from a variety of agencies involved in the issue.

PRO: Provides unity in addressing opposition or roadblocks

PRO: Distributes demand for finances, personnel, and resources throughout the region

PRO: Acknowledges the concepts and desires of multiple agencies during the design stage

PRO: Structure is one that is common and comfortable to many law enforcement agencies in the region

PRO: Bonds a portion of the stakeholders together in working towards a common goal

PRO: Lead position may be shifted if necessary to further the issue, or if priorities require a shift of personnel

CON: Group process may slow implementation

CON: Individual agencies may need to reassign personnel resulting in changing levels of familiarization and skills

CON: May result in scheduling conflicts between regional representatives

CON: Level of commitment may vary between participants resulting in a miscalculation of resources

CON: Management time may increase due to contracts, handling of funds, and time necessary to inform participants of minor occurrences

CON: Vendors must answer to multiple views of project design and capabilities

STAKEHOLDER'S PERCEPTIONS: Stakeholder's may view the Lead Agency/Regional Team approach as a position of unity and strength. Decision points can be approached with the support of the region due to the participation of several agencies rather than a single agency. Law enforcement views may be altered to "our" program. The uniformity in design and implementation may accelerate the acceptance of the SVRN. Opponents may be frustrated by the necessity to address multiple agencies but will not be blocked from presenting their views and objections by the structure. Legal, social, and political challenges to the system remain as an option. Vendors may view the structure as an opportunity to gain commitment to the SVRN or as a threat due to the need to address multiple views of how the system should be designed.

ALTERNATIVE THREE; JOINT POWERS AGREEMENT: A Joint Powers Agreement is a contractual agreement between two or more governing bodies to address an issue of mutual concern. State law provides specific authority to the agency to issue bonds, subject to certain restrictions, to further the interests of the agency. This form of agreement is used by municipalities, counties, and special districts for a variety of purposes including library construction, animal control, recreation facilities, and

public safety communications centers. The advantages and disadvantages of a Joint Powers Agreement are listed below:

PRO: The agency may issue bonds and establish service fees to provide start up and operational funds

PRO: The corporate structure may provide a degree of protection from liability should the system fail or financial or personal loss incur as a result of the system

PRO: Responsibility is clearly defined

CON: Contract structure is rigid and hard to modify to allow additional participants or initiate change

CON: The joint powers structure is not used on a widespread basis by law enforcement other than for facilities

CON: Management problems may arise due to the number of cities in Los Angeles County

STAKEHOLDER'S PERCEPTIONS: Stakeholders may become frustrated with the joint power process. The process may become bound in a series of contract negotiations among the governing boards of the 86 cities in the county as well as county government. Private industry may feel the process is overwhelming and move to another market area. Individual participants may be discouraged from participating in the system due to the rigid structure.

RECOMMENDED ALTERNATIVE

Following an evaluation of the three alternatives in terms of the short and long range impact on the future of a stolen vehicle recovery network in Los Angeles County, and the mission of law enforcement, the lead agency/regional team strategy was selected as the recommended strategy. It is recognized that the Los Angeles Police Department has functioned in

a single lead agency position during the formative period of introducing a change in policy, procedures, and technology. The research, identification of technology, and introduction of the concept of a regional SVRN has been expedited by their efforts. A shift to the recommended strategy will facilitate development of the SVRN on a regional basis.

The lead agency/regional team approach is a valuable tool during the formulative phase of a regional program. The structure is familiar to law enforcement through programs such as the California identification system and regional enforcement teams. The structure provides for varying levels of commitment ranging from contractual agreement for the purchase of equipment to the formation of multi-agency enforcement teams. The regional team approach provides a base of support necessary for lobbying for funding for equipment, seeking prosecution emphasis on the vehicle theft problem, or expanding the focus of the SVRN.

ADMINISTRATION AND LOGISTICS

Administrative and logistical support necessary to implement the recommended alternative consists of the following items:

Research and Development: The architecture for a stolen vehicle recovery network has been undertaken by the City of Los Angeles. The safeguards designed into the system ensure law enforcement control of the system to avoid a series of false reports or complicated communications between multiple dispatch centers. Through this phase, a vendor was identified who is willing to incur the majority of the cost necessary to implement a SVRN which has the ability to serve Los Angeles County.

The securing of required components: The approval of a permanent frequency devoted to stolen vehicle recovery network technology is currently pending, as is approval for an interface between the SVRN and the Department of Justice's Stolen Vehicle System. Regional support for these items are necessary to complete the foundation of the SVRN.

The single agency lead position held at the inception of the project needs a show of regional support for the SVRN.

Identification of technical components: Technical issues related to the SVRN, such as where the transmitters should be located. An effective regional program will require extensive testing to identify the most effective placement of the activators. It is anticipated that much information can be gained through county-wide communications studies which have been completed for other applications.

Implementation of the SVRN on a test basis: To implement the SVRN on a test basis, a shift to a lead agency/regional team concept begins to emerge. To accomplish this step, it is necessary to gain commitment of the law enforcement agencies within the county to participate in the SVRN. While the single agency lead approach has been effective in bringing a vendor to the region, it is necessary to bring other law enforcement agencies on line to form an effective network.

Marketing: The marketing of the system will be a dual responsibility. The selected vendor will market the transmitters designed for the consumers vehicles. Law enforcement will need to market the system within the profession at both a command and line level. Reinforcement of the goals and capabilities will need to occur during the implementation phase as time for the distribution of consumer transmitters is required before the line officer will realize the impact of the system.

Evaluation: Once on line, the SVRN must be thoroughly evaluated to identify the value of the SVRN to the region, the areas which need restructuring, and the areas of strength.

Revision based upon evaluation: The SVRN will require revision based upon the evaluation process. The revisions may be slight adjustments or major reform in technology or management structure.

Expansion of the Network: Following implementation, testing, evaluation, and reform, the system needs to be reviewed for expansion.

Expansion may be addressed in several forms: the expansion into multiple regions; the expansion of technology to include additional features or satellite capabilities. Expansion will be dependant, to a large part, on the success of the SVRN during the test phase. It is expected that adjoining regions may wish to implement complementary SVRN applications during the test phase. The completion of a foundation for the Los Angeles County SVRN will establish the availability of regional networks through the distribution of activation transmitters, marketing of consumer transmitters, and equipping of law enforcement vehicles.

COMMAND AND CONTROL

Command and control components of the strategic plan will establish the basis for evaluation of the stolen vehicle recovery network in Los Angeles county. We can evaluate the effectiveness of the SVRN through the collection of the following data:

Number of consumer transmitters: This data will present law enforcement with a tool to evaluate the size of service population that is being served by the SVRN. The data also becomes a tool for negotiations with potential vendors in regards to refining the technology. A cost/benefit relationship may be drawn from this data.

Number of SVRN equipped vehicles that are stolen: How many stolen vehicles are equipped with SVRN transmitters? This data will identify the potential for law enforcement interdiction in the stolen vehicle problem. Target population of high risk for theft of motor vehicles may not participate in the SVRN resulting in a low ratio of stolen vehicles which are equipped with SVRN transmitters.

Nature of crime involved: The identification of the nature of crime involved with the stolen vehicle equipped with a SVRN transmitter will help identify the effectiveness of the SVRN in addressing violent crimes. The hierarchy of reporting crimes to the Bureau of Criminal Statistics causes vehicles taken by force to be reported as a robbery.

The collection of this data will clarify the role of the SVRN in this area.

Rate of Recovery: How many SVRN vehicles are recovered, the average recovery time, and the condition of the vehicle at the time of recovery. This data will provide a basis for evaluating the effectiveness of the SVRN in reducing the financial and social impact of motor vehicle theft of SVRN-equipped vehicles as compared to those vehicles which are not equipped with a SVRN transmitter.

Rate of Arrest: The number of arrests which are made as a result of SVRN equipped vehicles. This data will allow comparison of arrest rates for SVRN equipped vehicles as compared to those vehicles which are not SVRN equipped.

The data described would need to be collected by each agency participating in the stolen vehicle recovery network. The data could be formatted into the Department of Justice recovered vehicle format for input at the time the vehicle comes under control of law enforcement or collected by the lead agency in the regional program.

The collection of data to allow evaluation of the system is essential. Many of the categories of information described above are not collected in Massachusetts. As a result, the true impact of the system cannot be evaluated.

The development of a strategic plan provides a means to bring into reality the desired and obtainable future described in the normative future scenario. The strategic plan is developed through a situational analysis which reviews the opportunities and threats present in the community as well as the strengths and weaknesses among the law enforcement profession in the region. The identification of persons who have a vested interest in the issue and their perceptions regarding the issue assists in the development of alternative strategies, which are subject to evaluation. Following selection of a recommended alternative, or a combination of several alternatives, a worksheet of steps required to bring our desired

future into reality can be prepared. The final step in the development of a strategic plan is to identify the evaluation process.

The development of trends and events, identification of possible futures, and the preparation of a strategic plan has provided a means to implement a stolen vehicle recovery network in Los Angeles County.

PART THREE - THE TRANSITION PLAN

How can Los Angeles County Law Enforcement agencies manage the implementation of a stolen vehicle recovery network during the next 10 years?

TRANSITION PLAN

The strategic plan provides an outline for implementing an alternate future for addressing the motor vehicle theft problem in Los Angeles County. In order to implement a stolen vehicle recovery network which would impact the motor vehicle theft problem in Los Angeles County, it was recommended that a lead agency be identified to establish a regional team framework among law enforcement. The team concept will facilitate the implementation of a test program for the SVRN, provide for the procurement of necessary equipment and training, and identify evaluation criteria.

The transition plan provides for the management of strategic change through three phases of transition: the letting go of old concepts of police officers driving around and randomly inquiring as to the status of individual vehicles; the neutral zone following recognition of a desired change, but prior to implementation of change; and the future state where the desired future emerges.

CRITICAL MASS

The critical mass is the minimal set of individuals or groups that are necessary to create the desired change. The critical mass differs from the stakeholders due to the intensity of influence regarding the issue. The critical mass identified regarding the stolen vehicle recovery network includes the following members:

1. Los Angeles Police Department
2. Los Angeles County Sheriff's Department
3. Department of Justice
4. Federal Communications Commission
5. Police chiefs

6. Consumers

7. Vehicle security vendors

8. Stolen vehicle recovery network manufacturer

Each member of the critical mass can be analyzed vis-a-vis their current position in relation to the issue, and the position which they need to assume to successfully implement the recommended alternative in the strategic plan. The chart on page 72 identifies the current position and desired position of each member of the critical mass in terms of block the change, let the change happen, help the change happen, and make the change happen. Where the current position and desired position are the same, simple monitoring of the stakeholder's position is all that is required. When a change of position is indicated, negotiation strategies may be identified which will assist in the desired change.

COMMITMENT ANALYSIS

CRITICAL MASS	BLOCK THE CHANGE	LET CHANGE HAPPEN	HELP CHANGE HAPPEN	MAKE CHANGE HAPPEN
LOS ANGELES POLICE DEPARTMENT			O	X
LOS ANGELES COUNTY SHERIFF'S DEPARTMENT			X	O
DEPARTMENT OF JUSTICE		XO		
FEDERAL COMMUNICATIONS COMMISSION		XO		
POLICE CHIEFS		X	O	
CONSUMERS		X	O	
VEHICLE SECURITY VENDORS	X	O		
STOLEN VEHICLE RECOVERY NETWORK MANUFACTURER			O	X

X = PRESENT POSITION
0 = DESIRED POSITION

The position of the members of the critical mass and their importance during the transition period are described in the following paragraphs.

LOS ANGELES POLICE DEPARTMENT - The Los Angeles Police Department is functioning in a "Make it Happen" mode. The department currently has assigned three officers to the task of researching and coordinating the implementation of a SVRN for the city. The leadership role of the Los Angeles Police Department will lead to the identification of a vendor, negotiations for SVRN equipment, and coordination of legislative approval to implement the system in the city of Los Angeles. This foundation will provide SVRN service to the entire county if similar tasks can be accomplished on a regional basis. The police department needs to shift to a "help it happen" posture in relation to the regional application of a SVRN. The current posture, while appropriate for the city application, may block a degree of cooperation in the region due to the perception of vested interests since Los Angeles City experiences about one half of the motor vehicle thefts in the county.

LOS ANGELES COUNTY SHERIFF'S DEPARTMENT - The Los Angeles County Sheriff's Department is operating in a "help it happen" mode. The department is capable of providing technical assistance to the Los Angeles Police Department in terms of radio communications, the placement of activation transmitters, and related topics. The Sheriff's department can conduct tests on the suggested SVRN transmitters and can be supportive of the research. An appropriate role for the agency will be a shift from the "help it happen" mode to the "make it happen" role. This suggestion is based on the history of the agency in leading successful multi-agency programs, the reputation of the command, training, and technical staffs, and the county-wide jurisdiction. The commitment of the Sheriff's department would be a substantial benefit to the program. Additional factors to consider are the political support, media relations capability, and influence of the sheriff with the chiefs of police within the county.

DEPARTMENT OF JUSTICE - The Department of Justice currently operates in a "let change happen" mode. This title may be misleading in this particular case as it is viewed that the department is neutral and will

evaluate requests for a computer interface based on legal and professional criteria. The department has the authority to grant or deny access to the stolen vehicle system and has the authority to lend technical staff to establish operating guidelines should consent be granted.

FEDERAL COMMUNICATIONS COMMISSION - The Federal Communications Commission will also function in a "let change happen" mode. The commission has the authority to grant or deny the availability of radio frequencies necessary to operate a SVRN as proposed. The commission will remain neutral and base their decision on legal and technical merit after a series of public comment periods and public hearings. The commission has the expertise to establish operating guidelines should consent be granted.

POLICE CHIEFS - Police chiefs in Los Angeles County are currently in a "let change happen" mode. The chiefs have received a minimum of information regarding the proposed SVRN and have not made commitments regarding participating in the system. Timing is an essential component in dealing with the police chiefs. The preparation of budget requests to obtain the required tracking equipment could determine commitment dates. The lack of funding or alternative methods of obtaining equipment could stall participation for several months or a fiscal year. The chiefs need to move to a "help change happen" mode to establish an effective SVRN. This shift will require extensive consultation and allocation of resources.

CONSUMERS - Consumers in Los Angeles County are currently in a "let change happen" setting due primarily to a lack of information regarding the product and the proposed SVRN. It should be noted that a considerable number of consumers have read articles in the Los Angeles Times regarding the progress of the project in the City of Los Angeles. Consumers need to be moved to a "help change happen" mode due to their essential role in purchasing transmitters for their vehicles. Consumers need additional information from the manufacturer and local law enforcement to effect the desired shift.

VEHICLE SECURITY VENDORS - The SVRN is being opposed by an organization representing vehicle security vendors. As such, the group is in a "block change" position. Opposition at public hearings have focused on the view of the proposed SVRN as a monopoly. While the project may proceed over the objections of this group, a shift to "let change happen" would be desirable. This shift may come to reality through the exhaustion of litigation or through favorable sales of security products in conjunction with SVRN equipment.

STOLEN VEHICLE RECOVERY NETWORK MANUFACTURER - The SVRN manufacturer has been functioning in a position of "make change happen" during the initial introduction of the SVRN in Massachusetts and Los Angeles. The work of this member of the critical mass has been instrumental in gaining the support of a lead agency and initiating the steps required to implement the SVRN. There needs to be a shift to "help change happen" during the transition period to avoid an appearance of self-serving interests.

The identification of required levels of commitment from each member of the critical mass allows for the preparation of broad negotiation strategies to present, explain, and sell the stolen vehicle recovery network to the critical mass. It is important to encourage a sense of cooperation which provides win/win solutions when possible. Compromise may allow the needs of the various constituencies to be met without expense to the project.

MANAGEMENT STRUCTURE

Identification of the critical mass allows the development of a management structure during the period of transition. Due to the number of individuals and agencies involved in the transition period, it is helpful to develop a list of key decisions and tasks as well as a list of individuals or groups involved in the transition process. The decisions are listed in the chart on page 77. A "R" is used to designate the person or agency which has the responsibility to coordinate completion of the task. An "A" is used to indicate agencies or individuals which must

approve a decision, a "S" indicates an area where support of the agency or individual is needed, and an "I" is used to identify an individual or agency which must be informed of a decision. Areas where there is no involvement on the part of an individual or agency are identified with a dash (-).

RESPONSIBILTY CHART

Decision	Los Angeles Police Department	Los Angeles Sheriff's Department	Federal Communications Commission	Department of Justice	Approved Vendor	Chiefs of Police	Regional Team
Conduct Research	R	S	- -	- -	- -	I	- -
Approve Vendor	R	A	- -	- -	I	S	- -
Frequency Approval	R	S	A	- -	S	S	- -
DOJ Interface	R	S	- -	A	S	S	- -
Evaluate Radio Technology	I	R	I	I	I	I	- -
Install Radio Equipment	S	A	- -	A	R	I	- -
Gain Law Enf. Comm.	S	S	- -	- -	I	S	R
Develop Policy	A	A	- -	- -	S	A	R
Market Transmitter	I	I	- -	- -	R	A	S
Market Trackers	I	I	- -	- -	R	I	R
Train Officers	S	S	- -	- -	S	S	R
Evaluate Program	I	I	- -	I	I	I	R
Refine System	S	S	A	A	R	S	I
Expand Technology	I	I	A	A	R	I	I

R = Responsibility S = Support -- = No Involvement
A = Approval I = Inform

The Los Angeles Police Department has assumed the responsibility to research emerging technology, approve a vendor based upon established selection criteria, and be the lead agency in seeking approval of an interface with the Department of Justice's stolen vehicle system. The police department also has coordinated the comments submitted to the Federal communications commission regarding allocation of a frequency for SVRN application.

The Los Angeles County Sheriff's Department, while supporting the efforts of the Los Angeles Police Department, has assumed the responsibility for evaluating the possible sites for installation of the activation transmitters necessary to initiate the SVRN. This task falls to the Sheriff's department due to their control of regional communications facilities. Installation of equipment will require the approval of the Sheriff's department and support of the Los Angeles Police Department.

The Federal Communications Commission will hold approval authority regarding the allocation of a frequency for SVRN application. The commission reenters the responsibility chart during the area of system refinements and expansion of technology due to the control of satellite frequencies and alteration of the use of the approved frequency, should alterations occur.

The Department of Justice has approval authority for the interface with the stolen vehicle system. The department, due to its various components, would also be an agency which should be informed of the impact of the SVRN following the three year test period. It is anticipated that the Department of Justice would also be involved in the refinement of the SVRN or expansion of technology due to issues of statistics, technology, and privacy of criminal justice information.

The approved vendor has the responsibility to provide radio equipment to activate the SVRN transmitters, the computer interface, and a number of tracking units. The vendor must also develop a marketing strategy to facilitate distribution of the consumer transmitters and must market the tracking units to local law enforcement. Marketing of the tracking

units may entail seeking legislation to provide equipment to local agencies, long term leases, outright sales, or donations of equipment. The vendor will also assume responsibility for refinements of the system in the future. While LoJack has received approval to commence a three year test period in the City of Los Angeles, "approved vendor" could be a variety of companies in the future. The region may experience an approved vendor in several capacities: a satellite vendor, a vendor such as LoJack, or a combination of both.

Chiefs of police in Los Angeles county function in a position of supporting the SVRN and receiving information from a variety of sources. The chiefs will provide an essential role in the formation of a regional team and policy as it relates to the SVRN.

The regional team consists of a governing board comprised of the lead agency as well as representatives from agencies participating in the SVRN. The purpose of the regional team is to manage the implementation of the SVRN, build support within the region, and seek resources necessary to form an effective SVRN. It is anticipated that the board would be supported by technical subcommittees responsible for developing marketing among the law enforcement agencies, training of police officers, and designing an evaluation tool. The committees will also serve a liaison with firms during the expansion and refinement of the SVRN.

The representative/lead agency style of management is an effective form of management during the transition state as it facilitates communication and participation from each of the participating agencies. The exposure gained from this form of management structure may induce participation by the various agencies within the county.

SUMMARY

The future state produces a regional approach to the identification and recovery of stolen motor vehicles. Law enforcement agencies will enjoy a technology which is currently available but has not been applied in the area for the stated purpose. A blending of resources between private

industry, government, and the consumer will allow introduction of the system without imposition of taxes to the general population of the county.

The present state presents a situation where stolen vehicles are identified on a hit and miss approach. If something out of the ordinary catches the attention of a police officer or a member of the community, an inquiry is initiated to determine the status of the vehicle. It is possible, and common, for stolen vehicles to sit for days prior to being discovered. These conditions makes the stolen vehicle a viable tool in the commission of violent crimes due to the lack of identity associated with the vehicle.

The area between the desired state and the present is a period of transition. If properly managed, the transition can be accomplished with a minimum of anxiety and uncertainty.

CONCLUSION

The purpose of this research project was to review technologies available to law enforcement to assist in the recovery of stolen vehicles and identify the impact that could be realized through implementation of a stolen vehicle recovery network in Los Angeles County. The recovery of stolen motor vehicles has remained virtually unchanged for decades. Police officers look for stolen cars every day but it is difficult to distinguish a stolen vehicle from others on the highway or in a parking lot. Officers may drive past stolen vehicles without checking to see if the vehicle is stolen if something doesn't draw their attention to the vehicle.

The first goal, identifying technology, was met with relative ease. A vast amount of information about past, present, and future applications of tracking technology is available. Projections of the service capacity of satellites, in both present and future terms, are readily available. A trip to Boston, Massachusetts, and the surrounding communities provided a look at an operating stolen vehicle network and the opportunity to assess the social, technological, economic, environmental, and political issues associated with the system. During the research, the author was able to participate in the tracking of a stolen vehicle equipped with a SVRN transmitter and its recovery, nine minutes after the signal was intercepted by a Boston police officer on general patrol. A series of interviews with state and local government agencies displayed what tasks must be accomplished in the immediate future, the next three to five years, if a SVRN is to be implemented in Los Angeles County.

The second goal, assessing the impact of a SVRN on the vehicle theft rate, on the rate of recovery, or on other violent crimes was a task far more difficult. While the rate of recovery can be projected, law enforcement currently experiences respectable performance in this area. The real issues relate to the impact which the SVRN can have on the speed of recovery, the economic loss, and the interdiction in other violent crimes. The majority of information sought in this area

could not be obtained through the operating SVRN. While recovery time and amount of loss is recorded by the vendor, law enforcement agencies do not appear to be gathering evaluative data. The SVRN in Massachusetts has undergone the formative process and is now beginning to produce consistent results.

A stolen vehicle recovery network will have an impact on Los Angeles County. The real impact will not be known for three to five years, when the SVRN has had a chance to become operational, a test period has elapsed, and data has been gathered. The importance of regional application of the technology in order to gain the maximum benefit cannot be understated. It was obvious that the application of the system in Massachusetts began in Boston and feathered out to the surrounding communities on a piecemeal basis. Los Angeles County has an opportunity to develop a regional commitment to a SVRN from inception and realize an impact from the effort.

The research undertaken during this project identified several subissues. Some of these issues are the relationship between government and private enterprise in projects which aid law enforcement and create a viable economic market, the politics associated with change, and the application of traditional technology in a non-traditional manner. Each of these issues could become a research project in itself.

A topic which is not an issue at this time, but may emerge as an issue in the future, relates to the right of privacy. The proposed technology for the SVRN and the architecture of the system provides for voluntary participation on the part of consumers. Should the system become mandated in the future, could there be a privacy issue if law enforcement sought authority to activate units as a tool to locate individuals? A more contemporary issue may address the use of the system to locate missing persons who have voluntarily purchased a SVRN transmitter. While both situations are precluded in the current system, emerging trends, events, and the level of effectiveness of the system may induce a change in operational procedures.

Law enforcement agencies in Los Angeles County have the opportunity to accomplish an improved level of service, impact crime in the region, and assume a leadership role in the application of technology at virtually no cost to their constituents. Technology has been identified, a vendor selected, and technical evaluation has been initiated, but the SVRN is still an item for the future of the region. Can law enforcement gain the necessary commitment, develop a strategic plan and manage the transition between the present state and the desired future? Only the future will tell. If social, technical, economic, environmental and political issues are successfully addressed, vehicles in Los Angeles County will be able to cry for help when they are stolen.

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APPENDIX A
NOMINAL GROUP PARTICIPANTS

AUTOMOBILE DEALER: The dealer of record with a domestic manufactured automobile agency. Prior experience includes twenty-four years of retail automobile experience including work in all aspects of the automobile industry (parts, service, new and used cars). Previous positions includes service manager, parts manager, used car manager and new car manager at both import and domestic dealerships. Purchased own dealership in 1981.

AUTOMOBILE FLEET SALES: A high volume fleet sales coordinator for a multi-dealership corporation. Fourteen years automobile sales experience. Top one percent in sales volume and income. Knowledgeable of marketing trends, consumer interests, and acceptance of technology by the consumer.

AUTOMOBILE THEFT INVESTIGATOR: An automobile theft investigator with the southern division of a statewide law enforcement agency. Nine years of law enforcement experience, of which the last two have been in the automobile theft investigation unit. Primary goals of the unit are the apprehension of organized theft rings and the professional thief, and assisting other law enforcement agencies, upon request, with vehicle theft investigations.

AUTOMOBILE THEFT INVESTIGATOR: An automobile theft investigator with a municipality in the greater Los Angeles area. Twenty-six years of law enforcement experience, fourteen years in an automobile theft investigation assignment. Caseload has included major automobile theft rings. Extensive training in the area of automobile theft investigation and has instructed training classes in the subject.

INSURANCE INDUSTRY: A management level representative from a major California insurance agency with twenty-seven years experience. Areas of specialization include investigations and litigation. Responsible for management and control of all areas involving fraud, external and internal.

NATIONAL AUTOMOBILE THEFT BUREAU: The assistant manager of the National Auto Theft Bureau, Pacific Coast Division. Previous experience includes twenty-three years with the California Highway Patrol, of which twelve years were spent as a vehicle theft investigator, and nine years as a field agent with the National Automobile Theft Bureau.

POLICE MID MANAGER: A Police Captain with a municipal police department in the San Gabriel Valley area. Fourteen years experience in law enforcement, currently commanding the field operations bureau. Holds Bachelor of Science Degree in Public Administration. Law enforcement experience includes

patrol, investigations, and traffic assignments. Has a background in automobile collision repair, including repair of stripped grand theft auto recoveries.

POLICE SERGEANT: A police sergeant with a major municipal police department in Los Angeles County. Currently assigned as stolen vehicle recovery network coordinator. Prior assignments include project manager 9-1-1 implementation, and officer in charge of emergency command central communications systems. Recognized as distinguished visiting professor in communications systems management, Ohio University 1988. Vice President/Senior Technical Staff of computer and communications consulting firm. Sixteen years of law enforcement experience.

PUBLIC RELATIONS MANAGER: The Public Relations Manager of a new car manufacturer. Prior experience includes ten years as an automobile journalist, testing new vehicles for magazines. Author of several automobile security articles dealing with alarms and protection of vehicles. Personal experience as the victim of an auto theft.

SHERIFF'S LIEUTENANT: A Sheriff's Lieutenant currently managing the communications and fleet management bureau. Responsible for project management and implementation of new communications systems and maintenance of existing communications systems. Twenty-seven years of law enforcement experience, sixteen as a Lieutenant. Master of Arts Degree in Management from University of Redlands. Assigned to communications for past three years. Designated as liaison for implementation of Stolen Vehicle Recovery Network for past fifteen months.

APPENDIX B
CANDIDATE TRENDS

1. Rate of GTA's
2. Rate of L.A. County GTA's
3. Law Enforcement Concern re GTA
4. Interest in Information Technology
5. Economic Concerns - Impact of GTA
6. Rate of Auto Purchases
7. Self Protection
8. Type of Vehicle Stolen
9. Reported Rate of Recovery
10. Number of Court Cases
11. Number of Juveniles Involved
12. Vehicle Thefts "For Hire"
13. Low Risk - High Profit
14. Level of Media Interest
15. Rate of Insurance/New Sales
16. Level of Prosecution
17. Value of Cars Stolen
18. Types of Alarm Systems
19. Nature of Problem (Regional)
20. Rate of GTA's Involved in Violent Crime
21. Number of Ethnic Background
22. Ethnic Influence of GTA
23. Level of Commitment to Auto Theft Problem
24. Industry Approach to GTA
25. Impact of Auto Theft on Sales
26. Ability of Thief to overcome Protection

27. Increase in Protection vs. Increased Ability to Defeat Protection
28. Increase in Law Enforcement Ability to Locate Vehicles
29. Level of "Greed"
30. Level of Competition
31. Level of Stripped GTA
32. Rate of "White Collar" GTA
33. Value of Cars
34. Level of Community Involvement
35. Consumer View of Possibility of Theft
36. Stylish Equipment
37. Level of Public Information
38. Level of Consumer Denial
39. Level of Sales at Auto Dealers
40. "Trendy" to Have Security
41. Level of Profit at Point of Sale
42. Instant Results/Gratification
43. Size of "RF" Equipment
44. Competition for Market

APPENDIX C
CANDIDATE EVENTS

1. Saturation of Market
2. System Marketing Begins
3. Law Requiring System
4. Law Enforcement Staffs For Workforce
5. L.A. City Council Approval
6. State Approval
7. High Risk Cars
8. Reduction in Number of Autos
9. Public Acceptance/Supports system (Pressure Lobby Group)
10. System is Refined
11. F.C.C. Allocates Frequency
12. Incentives Adopted
13. Successful Prosecution of Cases
14. Media Supports System
15. Law Enforcement Commitment to System
16. Manufacturers Communications With All Involved Industries
17. Car Thief Targets Victim
18. Competition Generates "Improved Product" Line
19. Private Industry Initiates "Sub System"
20. Sun Spots Zaps System
21. System Refined To Do Multiple Functions
22. Decision To Deregulate System
23. False Reporting Increases
24. Legislation Closely Regulates System