

THE IMPACT OF SMART HIGHWAYS  
ON  
LAW ENFORCEMENT PATROL OPERATIONS

Article  
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During the past century, several trends and events have led to six changes in the character of society. Each of these changes has forever altered or influenced the perception of law enforcement's connection to highways. The first change is the introduction and development of the automobile.<sup>1</sup> The second is the development of roadways, freeways and expressways to assimilate and accommodate the introduction of the automobile.<sup>2</sup> The third change is the development of a statewide system of engineering, education and enforcement by the California Highway Patrol and the other entities and jurisdictions responsible for the oversight of these roadways.<sup>3</sup> The next group of societal alterations can be classified as belonging to the modern era of societal changes.

The fourth change is the development of safety and communication technologies developed outside the realm of highway systems. Potentially, these could be used to monitor and maintain highway systems and the vehicles which use those systems.<sup>4</sup> This includes integrated communication between those disparate technologies.<sup>5</sup> The fifth change is the recent combination of resources used to integrate these newly-developed technologies with other statewide entities such as the California Department of Transportation.<sup>6</sup> Finally, the sixth is the future forecasting of technologies and how they will impact law enforcement in the future. Society has long welcomed and embraced technology and how it will produce positive changes economically, socially, historically, politically, environmentally and emotionally.<sup>7</sup>

We now know and understand that law enforcement has developed a nexus to the roads upon which we drive. What we do not know is what the law enforcement officer will be doing in the next decade. The demand on highways has

grown significantly during recent decades.<sup>8</sup> From 1970 to 2000, there has been a 41% increase in employment, a 34% increase in licensed drivers, a 67% increase in miles traveled and a 33% increase in vehicles owned per one-hundred people.<sup>9</sup>

Since the invention of the car at the turn of the past century, new terms, new directions, and new influences have arisen. We now use such terminology as Intelligent Transportation Systems (ITS), Automated Highway System (AHS), (IVHS), and Advanced Cruise Assist Highway Systems (ACAHS).<sup>10</sup> There are also systems that include Advanced Traveler Information Systems (ATIS), Advanced Vehicle Control Systems (ACVS) and Automated Traffic Management System (ATMS).<sup>11</sup> The intelligent vehicle highway system was viewed as a realistic, achievable solution to the traffic problems as sought by Automated Public Transportation Systems (APTS).<sup>12</sup>

Other related technologies utilized on highway system include (GPS) Global Positioning Systems, Remote Emergency Satellite Cellular Unit (RESCU) computer and broadband communication systems.<sup>13</sup> These interrelated technologies which were direct descendants of trends and events from the aerospace industry during the past two decades and before.<sup>14</sup> All of these combine to develop a self-monitoring, analysis and reporting technology (SMART).<sup>15</sup> The vehicle is now secondary to the technology in and around the vehicle and technology is always far advanced of our ability to assimilate and accommodate the change.

Without the invention of the automobile, the resulting highways, the inter-

connected technologies, the enforcement connectivity, the immense social connection to the automobile would be absent. The automobile has precipitated many inventions designed specifically for the automobile as well as foreign or unintended technologies which have been applied to vehicles and highways. New technology fosters and creates newer technology. Additionally, the more technology that exists, the more future growth of technology expands exponentially, rather than arithmetically. These new trends and events in technology will steer and propel our way into the future.

In the Iliad, Homer talked of a “self-moved, obedient to the gods” three-wheeled vehicle.<sup>16</sup> In the fourteenth century, an Italian painter, Francesco di Giorgio Martini designed a man-propelled carriage, mounted on four wheels. Leonardo Da Vinci conceived of armor-plated vehicle with hand cranks driving all four wheels. In the sixteenth century, Jacques de Vaucanson built a vehicle based on the workings of a clock. In 1679, James Watt made improvements to the steam engine. In 1769, Nicolas Joseph Cugnot built a self-powered, people steering transport. In 1839, Robert Anderson built the first electric-powered vehicle. In 1864, Siegfried Marcus built the first fuel powered one cylinder engine with a carburetor, a magneto and a piston. The automobile was off and running.

In 1850, when California was granted statehood, it created the Office of the Surveyor General whose duty was to suggest roadways. In 1895, the Bureau of Highways was created by the state legislature. In 1896, they recommended a system of state highways made up of 28 distinct routes, using existing roadways when possible, connecting all county seats. In 1909, the state legislature authorized construction of

3,052 miles of highways. In 1940, the first freeway in the western United States was opened, Route 110. Today, there are 2,311 miles of highways, not including freeways, California Scenic Highways, Historic Parkways, Interregional Roads Systems and Blue Star Memorial Highways.<sup>17</sup>

As a result of the development of our highways came the California Highway Patrol, along with ancillary organizations such as the American Automobile Association (AAA). The AAA, established March 4, 1902, provided information on roads, hotels and laws. The California Highway Patrol, created August 14, 1929, provided the enforcement for those laws.<sup>18</sup> The primary mission of the California Highway Patrol is “the management and regulation of traffic to achieve safe, lawful and efficient use of the highway transportation system.”<sup>19</sup> Later partnerships were formed to establish systems and programs to connect law enforcement to other public and private entities.

The California Department of Transportation (Caltrans) has recently established the Advanced Transportation System (ATS) Program. In collaboration with many partners, this program researches, develops, demonstrates, and supports deployment of technological advancements to provide a broad array of public services. Private businesses are linked to the public sector (which includes the federal government, California state government and regional governments) to test, deploy and evaluate ATS technologies. Caltrans also partners with the private sector, which offers a variety of transportation products and services, consulting, computer hardware and software, specialized equipment and informational systems.<sup>20</sup>

By bringing technology, manufacturing and marketing capabilities to the partnership, the private sector is critical in the successful implementation of these technologies. The ATS requires intelligent links between public infrastructures, vehicles, users and a greater level of private market deployment.<sup>21</sup>

Designed to be the technical foundation of a multimodal system, Transportation Management Centers, (TMC) perform many of the information gathering and systems management functions of the ATS. These services include: forecasting conditions which hamper transportation, enhancing public travel security, managing incidents, reporting emergencies, and regulating the overall transportation system. The traffic management system has traffic surveillance, onboard vehicle communication systems, traveler information networks, public transportation systems access, private vehicle monitoring, reservation systems, traffic signals and sensors, as well as environmental sensors.<sup>22</sup>

Intelligent vehicles are another element of the Advanced Transportation System. Cars, trucks and transit vehicles will soon be equipped to sense road conditions and obstacles around the vehicle. Such technology will increase safety, reduce congestion, decrease emissions and conserve energy. These include laser, radar and infrared detection fields, windshield cameras, blind spot detection and front and rear interval detection devices.<sup>23</sup> Through global positioning, an en route transit advisory shows the location of transportation units and coordinates with other transportation units. This includes some of the technologies connected with Caltrans but there are private entities and technologies which are still disconnected with our highways.

Finally, certain local city and county governments mandate law enforcement to respond to document, investigate and arrest as a result of crime on the highway. Some of the questions that have to be addressed regarding this issue of jurisdiction are: Will law enforcement partner with other governmental entities, private industry or collaborate with local city and county municipalities to monitor respond and handle calls for service? Will cities communicate with private security companies to facilitate a capture or arrest? Will the system allow for video and audio data transfer to law enforcement records as well as the judicial system? Will a regional task force, including public and private businesses and academia be necessary to answer these questions as well as respond to future questions and demands? These questions require answers and action which better prepare law enforcement for a greater connection to the future.

The challenge for our law enforcement managers and leaders is to identify technologies and entities outside of our organization which will assist the organization internally.<sup>24</sup> This may include an increased networking with state legislation, private industry, academia and other local and even statewide law enforcement agencies. Leaders must possess the desire to not only assimilate and accommodate change but also to forge partnerships that will best benefit law enforcement and the community in the future. Leaders of the organization must incorporate a change process to anticipate the potential impact of SMART highways. Leaders must prepare plans and develop scenarios to increase positive interactions and outcomes and limit negative impacts.

This change process requires the leaders of the organization to anticipate

the potential impact that current and future trends and events might have on the organization. The team must prepare plans to increase positive outcomes and limit negative impacts. The team must develop plans for negative economic impacts with community input and buy in already in place. Future forecasting will reduce down time and potentially steer the organization to more efficient, effective and greater reflect the wants and desires of the community.

Future forecasting identifies future possibilities. It reveals and analyzes possible future trends and events that could impact law enforcement organizations at different levels and varying degrees. It does not predict the future. The future offers varying degrees of uncertainty. The greater the number of factors introduced into the future, multiplied by time, increases uncertainty in geometric proportions. However, when the future possibilities about a specific issue are anticipated, plans can be developed to seek the best possible positive result while actively working to reduce negative consequences.

A Nominal Group Technique (NGT) can identify and rank order major trends and events which may influence the impact of SMART highways on patrol operations. The Nominal Group Technique is a structured process facilitated by a person who identifies a problem or issue to be discussed and reviewed. It requires a diverse panel to examine the dimensions on how SMART highways will impact law enforcement.

The NGT panel identifies trends and events. Trends are a series of incidents which indicate a direction that a particular issue may be heading. Events are different from trends in that events are singular occurrences, which may impact the

issue. Events occur on a specific date and time. It may take numerous trends to develop the impetus for a singular event, this is highly pivotal. A single event may also significantly impact future trends in a positive or negative way. Panelists ranked the events in priority order as to their potential impact on SMART highways.

Panelists were asked to identify the trends related to SMART highways that would impact patrol operations. The top ten trends are telecommuting, surveillance cameras, global positioning technology for vehicles, global positioning technology for people, working/ living in the community, vehicle disabling technology, satellites assume role of pursuer, facial imagery technology, people disabling technology and the internet reporting of crime.

The next step of the NGT identified the events that they felt might occur which would impact the issue statement. The top eight are global positioning in cars, surveillance cameras, hand held video, GPS in people, facial imagery, surveillance craft, SMART cars, and disabling chips.

Based on the empirical and theoretical information provided so far, including an analysis of trends and events identified in the NGT, the following optimistic scenario was developed forecasting probable futures involving law enforcements connection to SMART highways. Law enforcement should take actions and measures to best benefit their position as well as providing a safer community for the future. A best-case scenario can be developed by taking the trends and events and developing a positive future.

On June 25, 2009, GPS tracking with real-time technology is a reality. Automotive and homeowner insurance companies do not offer insurance to cover

vehicles without three hidden GPS chips and a motion sensor activation device. Upgraded systems, which offer vehicle-disabling devices, are available. Automotive insurance companies offer discounts on insurance for vehicles with GPS tracking and video surveillance camera systems to record who is driving. GPS systems are required on all auto-pilot systems.

Modern technology boasts solar power and plasma propulsion vehicles. The company called Geron has finally had success with the enzyme that overrides the aging process which enables human cells to divide indefinitely. The genetic clock in each cell and the bit of DNA associated is called "Telomere". There is one global electronic currency, multi-directional media capabilities and cell mapping. Updated news information is provided via a heads-up viewing displayed on eyewear or the windshield of a vehicle from a global status report. The report announced the winner of the 2009 Nobel Peace Prize.

The Nobel Peace Prize was awarded to Gary Alan Lewis of the United States for his contributions to an increase in public safety. His systems fostered a ninety-seven percent reduction in public crime, an eighty-nine percent increase in prosecution and arrest, and introduced a monetary connection to prosecution. These funds are now used to pay for additional private and public safety and scanning equipment. Lewis was also the driving force for the development of a secure private safety network for the home and personal vehicle.

These accomplishments made Corona, California, the safest city in the world. Corona was the first to implement the technology and equipment to accomplish a higher level of safety and security. In his acceptance speech, Lewis praised the

partnership and participation efforts of the community, private business and academia through their regional taskforce. The partnership provided results greater than any single effort.

Although Mr. Lewis was recognized for his safety information, he is also known for the generation of power from water going through plumbing in the home, windmill energy generated by passing vehicles to run street lights, the conversion from 120 volt to 42 volt home systems, cars with large 12 volt systems which can be plugged into the 12 volt lighting system in the home to provide lighting and save energy, holographic games, distance learning for kindergarten through high school, distant visualization of any external location as well as interactive internal visualization, such as museums, scent recognition technology, tele-medicine, 3-D picture with the viewer of advertisement displayed based on a GPS tracking chip, voice activated radio/phone and computer in the human jaw bone and home power generation from indoor lighting, and a topical patch medication delivery system.

Retail and commercial businesses have man-trap devices for all wanted suspects in the world. Facial imagery and GPS tracking activate these man-trap systems. Residential locations and businesses activate GPS information in humans and vehicles that enter unauthorized locations. A residential GPS system is activated when an unauthorized vehicle enters the driveway and the home surveillance cameras are activated. If a suspect breaks a window of the residence and takes property, the entire incident is captured via digital video.

The police are notified and a digital copy is made and transmitted to the court system. The officer downloads the crime and disables the vehicle less than one mile

away. Once the vehicle has been disabled, the suspect is disabled and a private location team responds and the suspect is arrested. Upon conviction, the suspect cannot drive another vehicle, anywhere, anytime, without being given an access code to bypass facial imagery. To gain future access requires an optional DNA identification. The conviction also restricts the defendant from entering unapproved locations or the suspect may be personally disabled or terminated as needed.

A facial imagery system can supplement a GPS system and the combined systems function on the same database. Facial imagery, GPS in people and vehicles, along with total public camera surveillance and DNA technology has provided the highest quality of life in history for the community. Public crime has been virtually eliminated: it has been reduced over ninety-seven percent this decade.

In order to change towards this best case scenario, leaders must hold the vision which tomorrow's technologies can bring. They must be leaders with a vision and the ability to welcome paradigm shifts for their future law enforcement organization. Leaders must incorporate transition management teams with a time element to accomplish a future which is structured and planned. Law enforcement organizations must be continually in flux and use the strategic planning process as a roadmap to their future.

Strategic planning anticipates changes in the organization and focuses on future issues, while not focusing on the issues facing the organization today. The proposed strategic plan will move towards an optimistic scenario while avoiding the pitfalls of a pessimistic scenario. The proposed strategic plan and selected transition

management team will lessen the impact of SMART highways on patrol operations in a mid-sized urban agency.

An effective strategic plan should integrate technologies and resources that are needed to best accomplish this vision, mission and goal. The strategic plan should examine external issues affecting an organization in five different categories. The domains that can influence an organization are social, technological, economical, environmental and political.

The strategic plan should examine the organizations internal strengths and weaknesses as well as the external threats and opportunities. After reviewing the strength, weaknesses, threats and opportunities, alternative strategies will be developed to accomplish the strategic plan. After reviewing the positive and negative aspects of each, the best strategy will be selected that provides the most positive impact. The result should provide the greatest positive impact for law enforcement patrol operations in a mid-sized organization. The vision, goals and objectives of the strategic plan of the organization should be toward the accomplishment of the law enforcement agencies mission.

Preparing for the future begins with a vision. A vision statement is a written description of a desired state of conditions. It is a snapshot of what the organization wants to achieve and what the future of the organization is to become. It is more than a single goal because it takes objectives to accomplish a goal and a series of goals to accomplish mission, which are in line with the vision. The vision, in a sense, is a journey that the organization takes. This vision benefits the organization, the community and the individual employees. The leaders of an organization must

impart this vision internally and to external organizations. An organization must prepare, taking into account trends and events, through a strategic plan to reach desired results. Having knowledge and understanding of a developed strategic plan will provide the best-case scenario for the future. Knowing how these trends and events may influence SMART highways' impact on law enforcement agencies creates a course of action to get the most desirable result.

The best way to incorporate all of these trends and events and related entities is to establish a regional task force. The regional task force should examine shared goals and objectives and provide policy and procedures to accomplish a shared mission.

The goals of the regional task force should encourage contact and communication. This communication should be countywide while having consideration for statewide and interstate communication. There should be the development or reciprocity and cooperation. There should be shared learning and trust. The objective is to bring all required entities into the task force so the future model will be put together in the proper order. This order will consider cost effectiveness, environmental issues, grant funding, and possible future growth in technology.

The results of the vision, goals and objectives will be a system to best address, react and be proactive for trends and events on SMART highways which will impact patrol operations. The optimal outcome will be a regional task force that plans and addresses all of these issues. The regional task force will take into consideration all of the stakeholders because the stakeholders themselves will be represented. The strengths and weaknesses will be examined by experts in fields of technology, budgets,

public works, public businesses and the private sector.

Any plans to affect organizational change must consider relationships with stakeholders. Stakeholders are individuals, and groups, both internal and external to the organization, who are impacted by, or who impact what an organization accomplishes. It is important to identify all stakeholders, especially those who have expressed little or no opinion or interest in the organizational plans. These latent stakeholders may arise during the final hour to interrupt or stop organizational change.

The significant stakeholders for a regional task force are the Federal Highway Administration, Mellon Robotics Institute, Rockwell, Siemens, University of California Partners for Advanced Transit and Highways, Hughes Aircraft, the automotive industry, state and local law enforcement agencies, highway design industry, vehicle electronics industry, environmental interests, insurance industry, transport users, trucking operators and unions, HP Microsoft Inc., Wiley Laboratories, U.S. Army Armaments, Caltrans, California Highway Patrol, Riverside Sheriff's Department, Riverside Police Department Orange County Sheriff's Department, Los Angeles Sheriff's Department, GPS systems managers, facial imagery industry, Corona Police Department Police Officers Association, Corona City Manager and City Council. These are recognized stakeholders because they stand to gain if they provide input and support to a regional task force. If they do not participate in a regional task force, these entities will lose financially, in information sharing, lost partnerships and lost input in molding the future to their best interests.

The organization is now used to change, being in flux, accepting new ideas, and has futures forecasting and strategic planning on an ongoing basis. This model was

developed by Anderson Corporate and Executive Coaching, Inc. and the following concepts include the assessment of internal and external stakeholders' needs, wants, problems, obstacles, strengths, opportunities and threats, conduct a planning session with key executives and stakeholders from the internal organization and the community and conduct an annual change plan review.<sup>25</sup>

When this model is followed, there should be an increase in success while reducing conflict, stress and opposition. The cornerstone of this model also includes the selection of leaders who will promulgate change, begin with a clearly articulated preferred future state and work backward from that perspective to the present and to recognize and document successes.

In order to accomplish the best case scenario regarding the impact of SMART highways on patrol operations, various strategies should be examined. One strategy would be to provide and foster a philosophy within the Corona Police Department, a climate rich in employee development. A second part of this strategy would be the staffing of selected employees to best represent the department in the future. A third part of the internal strategy would be the training of staff to best incorporate transition management and develop strategies to lessen negative impact on the organization. Now that the internal strategies have been discussed, strategies that go outside the organization should be identified.

Once identified and in place, the next strategy would be to step outside the realm of the organization with the development of a regional task force. A regional task force provides the best case scenario as it identifies the stakeholders, has a diverse group to be aware of pitfalls, and takes into consideration technological, financial, social

and political issues. Additionally, the task force has the resources, staffing, management, grant access, budget and diversity of stakeholders to accomplish the desired shared outcomes.

Based on the results of the NGT process and the literature review, three alternative strategies were developed relating to how patrol operations of the Corona Police Department will be impacted by SMART highways. Each of these strategies represents a different approach to the issue. The strategies provide overall guidelines for organizations to follow. The strategies take into account the major trends and events provided by the panel. The strategies consider the impact on law enforcement when GPS, facial imagery, and digital recorded surveillance cameras are in operation on SMART highways. In overcoming obstacles, the difficult portions will be in networking with those technologies and organizations outside of law enforcement. The second will be the significant demand in calls for service in response to these new technologies. More criminals will be caught and the volume of calls for service and arrests will tax the current organizational structure.

Next there should be a discussion of the transition template on how this recommended regional task force will be accomplished. It will include the specific roles of the stakeholders who are critical to the success of the regional task force. This will include the commitment from the critical members of the transition team, implementation plans, accountability, monitoring, accountability, and future review and modification.

Transition management is about managing change. The transition management plan will be accomplished by the transition management team. There are two transition

teams. One team is internal to the organization. The second team is the primary transition team which makes up the membership of the regional task force. The internal team within the organization is a member of the larger regional task force. The regional task force team is made up of the stakeholders on the most important issues of how SMART highways will impact patrol operations. The team is made up of the critical mass to make a regional task force a reality. They reflect the goals and objectives of the stakeholders. The culmination will provide the best forum, personnel, and procedures to minimize the negative impact of SMART highways on patrol operations. It would also be desirable to steer technology and the stakeholders to support patrol operations in the future.

The community must understand that officers may no longer respond to past crime, traffic accidents, or past civil problems. The community must understand law enforcements new role regarding SMART highways. The new role is designed to increase arrests and lower crime. Municipal code changes allow for public surveillance cameras. Officers make arrests as a result of videos. Officers are not in someone's house taking a report that will not result in an arrest or the reduction of crime. Officers' arrest identified GPS tracked and videotaped offenders as a result of this adopted new technology.

In order to accomplish a regional task force, the internal transition management team will have to work together to develop plans to ensure that the necessary organizational changes occur. The external transition management team should be composed to interagency representatives, private industry, academia and all levels and sections of city government. This transition management team must include, as integral

parts, commitment planning, and responsibility charting to foster change and cause change to occur.<sup>26</sup>

The interaction of the transaction management team with these other entities is designed to gain knowledge of how and when these automated highway systems will be introduced and the level of law enforcement participation and impact. Collectively, the needs of the public, commercial business, mass transit systems and the individual travelers will be reached. The overall goals of the regional task force team transition management team will improve safety, save departmental costs and optimize investment, improve accessibility and mobility, improve environmental efficiencies, increase connection to new technology based-industries.

The infrastructure concept envisions automated vehicles in dedicated lanes using global information and two-way communication with the smart infrastructure to support vehicle decision making and operation. It is at this level that law enforcement may have its second generation vehicle contact. This means that law enforcement will be reacting and acting to on-board GPS, facial imagery and other technological features. The infrastructure-assisted concept provides an automated roadside system and inter-vehicle coordination. It is at this level that law enforcement may have to actually invest hardware in the highway system or get contractual agreements to share information.

The transition management team must transform its vision of the future into reality. They must utilize new technologies and technologies not yet known today to meet societal needs of the next century. The team acknowledges changing populations, financial constraints and changing governmental roles. They must

maintain a close connection with the California Department of Transportation. The California Department of Transportation proposes to collaborate with many partners who research, support and deploy new technologies.

There are three emerging global markets that are competitive. There is the public sector, which includes local government, regional government, state government and federal government. The second is the private sector. This includes telecommunications, electronics, vehicle manufactures, aerospace, and non-profit organizations. The private sector partners will provide technology, manufacturing and marketing capabilities through a broad manifestation of products and services. Law enforcement agencies, in some locations, may try to market resources to benefit their budget. The third market is academia. This includes private and public universities. These key partners will provide leadership by keeping an emphasis on mobility, connectivity, interoperability, safety, environmental and other community, state or national goals.<sup>27</sup>

The goal of the partnerships is to employ an innovative approach to integrate private sector technology advances with the latest academic research to address the transportation needs of respective regions. According to the United States Department of Agriculture, Federal Highway Administration, the suggested partnerships are Caltrans, California Highway Patrol, local and regional law enforcement, funding sources, system operations, maintenance, technology development and implementation, public information and service and sharing resources. Other potential partners include metropolitan planning organizations, local transportation centers, local emergency responders, local mass transit, academia, media, the Federal Highway

Association, private industry and technology.

The following stakeholders are critical for the successful transition to integrate law enforcement and technology as it relates to the implementation of SMART highways in the community. The following stakeholders are necessary to inform, support, and approve the new template. These stakeholders include the city council, the robotics industry, trucking operators and unions, Police Officers Association (POA), CalTrans highway design, vehicle manufactures, electronics industry, state/federal legislators, academia, consulting team, insurance industry and private industry-satellite.

The regional task force has a real purpose for existence. The right people must be interested, capable and willing to work. The regional task force will encourage contact between all of the participants, develop reciprocity, encourage active learning, give prompt feedback, be timely and on task, and respect diverse talents and ways of learning.

In the next seven years, it is essential that all law enforcement organizations communicate with each other to share ideas and resources. This spirit and level of communication should provide the highest expertise, knowledge and sharing of programs. This will reduce or eliminate reinventing the wheel, reduce costs, reduce manpower and place less of a demand on resources.

It is more critical to incorporate strategic planning and transition management by utilizing staff with the greatest experience, training and exposure to future forecasting and change. This means that agencies will have staff specifically in place to review systems management, maintain resources and contacts for technologies, and have the skills needed for change implementation as a member of a regional task force.

Future challenges will face organizations that are trying to implement recommended new programs or SMART highway technological changes. By anticipating these challenges, plans can be set in place to show more clearly how all stakeholders will benefit from the transition management team and the responsibility charting with the recommended changes. Some of the challenges include, getting those agencies and individuals accustomed to technological changes, identifying the primary stakeholders and the impact they may have on the organization and the proposed program, prior to implementing program changes, identifying and considering the effects on internal and outside entities as well as their future impact on the organization, and programs must be monitored and feedback provided to ensure continuing review and improvement.

There are also some major pitfalls of vision. The consideration of any new vision increases uncertainty. People begin a planning effort because their current course is uncertain and they desire clarity. The planning process can cause confusion, as those involved with the transition team or who holds responsibility for the implementation are introduced to new threats and opportunities. Sometimes they plow ahead to decisions on vision and strategy which ultimately do not best benefit law enforcement on SMART highways.<sup>28</sup>

Upper management sometimes looks for the magical simple program. They do not seek the diverse programs and teams that will bring the best law enforcement change for SMART highways. Perseverance is the antidote. It takes time to turn a huge ship around or jump on another mode of transportation.

There are leadership challenges for thinking in the future tense. The new

tomorrow has arrived. It is global, knowledge-intensive, fast-changing, requiring high quality leadership, management and supervision. There are twelve resources and challenges for creating the preferred future. These include leveraging rapid change, creating learning organizations and communities, sustained innovation, managing interconnectedness, globalization of all business, restructuring for the long-range and global quality standards, re-training for knowledge-based work, taking seriously a multi-cultural society, environmental stewardship, promoting balance and sustaining hope and vision in the midst of turmoil.<sup>29</sup> There is a demonstrated need for a regional task force to examine not only SMART highways, but budgetary, legislative, and other concerns that may impact law enforcement in the future.

It is recommended that law enforcement agencies be prepared and maintain a future forecasting aspect in their organization. Law enforcement may be interested in further research to increase future positive impacts on the department. The regional task force may bring forth new ideas and technologies that would have remained uncovered if not for the actions, decisions and responsibilities of the regional task force members.

If organizations want to achieve the desired vision and be successful in developing a strategic plan with built-in flux, they must perform self-examination and an external audit. They must develop and nurture a philosophy which rewards creativity, positive risk and inter-organizational and intra-organizational communication. The transition management team will be tasked with developing strategies for the following issues in order to affect successful organizational change on SMART highways.

It is impossible to predict with absolute certainty what will occur with law

enforcement during the next decade. Legislative changes, technology changes, budget, resources and the level of support and direction from the public may greatly impact law enforcement in the future. These factors may also significantly impact law enforcement's ability to implement change even with internal and external support.

Leaders of the future must be more progressive by looking beyond current accomplishments, and focusing on the future and the stakeholders who may assist or hinder the success of the organization. Leaders of tomorrow will have the insight to examine future issues that will impact their organizations. With foresight, planning and knowledge of technologies, resources, and entities which surround the law enforcement organization, they will be more effective in meeting the needs of the organization and the community in the future.

The future success of an organization depends on planning, reviewing and incorporating progressive, thoughtful change. If an organization lets their future rest in another's hands, their fingers will point the direction taken. Law enforcement has the responsibility and the ability to improve the quality of life for the employees, the organization and the community. Law enforcement has the responsibility to build the ladder of success on the correct wall. Law enforcement must construct the future from the materials they choose, not what is handed to them.

This project has argued that SMART highways will impact patrol operations in the next decade. The utilization of GPS tracking chips in vehicles and humans on SMART highways will be the most significant technology that will impact patrol operations. GPS tracking along with surveillance cameras, facial imagery, hand held vehicle surveillance monitors, satellite tracking, and people disabling technology on

future SMART highways will impact patrol operations. These technologies will initially place a greater demand for services for patrol operations. As society acknowledges the certainty of being caught, the demand in the distant future will be reduced.

Law enforcement agencies must participate in the shaping of their future by means of a regional task force. There are promises, as well as limitations, to these new technologies; it will be up to the politicians, bureaucrats, private mega-industries and the public to integrate these technologies into the highway or public systems.<sup>30</sup> The three standard barriers include financing, difficulty of integrating and coordinating systems and vehicles and the complexity of setting standards.<sup>31</sup> As steam, electricity and fuels were the test bed for the twentieth century, SMART (self-monitoring, analysis and reporting technology) highways are the test beds for the twenty-first century.

Isaac Asimov once said, "It is change, continuing change, inevitable change that is the dominant factor in society today. No sensible decision can be made any longer without taking into account not only the world as it is, but as it will be....This, in turn, means that our statesmen, our businessmen, or every man must take on a science fictional way of thinking."<sup>32</sup> Law enforcement should all strive to participate and be discoverers of new lands. Law enforcement must participate in order to reap the rewards of its labors. Law enforcement must stay the course. Nobody would have blamed Christopher Columbus, or remembered him, had he turned back half way. However, he is remembered and praised for fighting the good fight and finishing the course.

## NOTES

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