

along the highways. In California, the CHP answers all these calls, and the information is fed immediately into the information system for the TOC.

Caltrans, the CHP, and the Metropolitan Transportation Commission in the San Francisco Bay Area and the Los Angeles County Transportation Commission, are jointly responsible for the freeway service patrols providing help to stranded motorists on the freeway system.

Caltrans has provided considerable funding to the University of California for research in IVHS as a part of the Partners for Advanced Transit and Highways Program (PATH). The research program involves work by several universities, Caltrans districts and the Office of New Technology, regional and local agencies, and the private sector. Universities which are currently involved are UC-Berkeley, UC-Irvine, UC-Davis, Cal Poly San Luis Obispo, University of Southern California, and Stanford. The private sector involvement includes professional consultants, major development and manufacturing companies, and small entrepreneurs. Some of the areas being studied or scheduled to be studied are computer simulation, methods for detecting incidents, closed-circuit television, on-board navigation systems, automated vehicle control, automated vehicle identification and location systems, information and communication systems, common and uniform data base for mapping, public policy, and organizational structure. There are tests beds in both northern and southern California.

Clearly, the state is developing an integrated traffic management system. It is investing a large amount of money in this system and expects to see the benefits to the general population both economically and environmentally. The system will be dynamic and flexible, expanding to accommodate new technology as it is developed and tested. The degree of success will depend on how well all the existing partners continue to work together cooperatively and the active participation by new partners.

Local Perspective

S. Edwin Rowe

Los Angeles Department of Transportation

Over the last year we have had a number of conferences on IVHS, traffic management, and integrated traffic management systems. The number of representatives from cities attending these conferences has been low. This has been a concern to many of us who realize the important role cities must play in ITMS. I am pleased to see a number of representatives from city departments in attendance today.

I would like to discuss what I see as some of the major issues associated with ITMS from the perspective of local jurisdictions. My opinions on many of these issues are based on experience with managing transportation during the 1984 Olympics in Los Angeles. This provided the opportunity to bring together all of the relevant operating agencies to develop and implement a full scale transportation management plan. Although we did not have many of the high technology tools that are available today, the program was very successful.



I have also been involved in the development and deployment of the automated traffic surveillance and control system (ATSAC) in Los Angeles over the last 10 years. Many of the features of this system represent the elements that will be needed in ITMS in the future. We have also been working with Caltrans, the California Highway Patrol, and other operating agencies on the Smart Corridor demonstration project. This will be the first project to apply all of these advanced technologies in an integrated traffic management system.

From a city perspective, I think the major issues related to ITMS include the organization of the various agencies, the system architecture, traffic monitoring requirements, development of the appropriate strategies, the increased levels of automation needed to operate the systems, the increased use of different media for traveler information, and the responsibilities of operation and maintenance personnel. I would like to discuss each of these briefly.

The major organizational question is who is in charge. In the case of the Olympics in Los Angeles, we decided to manage the transportation process by consensus. The jurisdictional responsibilities remained the same, but different activities were managed through the use of policy and technical committees that met on a regular basis. This organizational form worked very well and is also being used on the Smart Corridor demonstration project. A similar structure could be used with ITMS.

System architecture represents a technical issue. For the Olympics we started with a top down approach, focusing on a multi-jurisdictional traffic management center. Linked to this center we had the single jurisdiction operating centers and their field command post units. During the Olympics, most of the decisions were made at the field command post levels, with few decisions actually made at the top level. Thus, I think it is important to look at the costs and benefits of developing a traffic management center that attempts to include all agencies. It may be more appropriate and cost effective to link the existing operations centers, rather than

design a whole new center. However, it is critical that all the people in the different operating centers see the same traffic picture based on the same information.

To accomplish this in the Smart Corridor demonstration, a centralized data base has been established that provides the same information to all participating agencies. All of the information collected through the detectors and other networks flows into the respective operating centers and then into the centralized data base. What is important about this data base is that it fuses all available information from all the participating agencies to provide one composite picture of traffic conditions. This information is then made available to all participating agencies. It doesn't really matter where the central data base is located, as long as the communication links are there.

One of the deficiencies in many local areas is the lack of ability to monitor local traffic. Freeway monitoring has been in existence in a number of areas for many years. In an integrated traffic management system it is critical that information on the status of traffic conditions on local streets be available, since traffic may be diverted to—or encouraged to use—surface streets. Thus, there needs to be a better balance between the capabilities of the surface street system and the freeway system.

One scarce resource in many communities is the traffic engineers and technicians that will be needed to operate and maintain these systems. The increased responsibilities that come with ITMS will necessitate greater use of automated systems and special training for the personnel needed to operate and maintain these systems. It will also be important to look at the development of expert systems for unusual events. We need to look beyond recurring congestion, respond automatically to these to unusual events, and provide a decision support mechanism for the operators. These may include very complex situations, which will need to be supported by some type of expert system.

Adequate benefit analyses of ITMS are also lacking in most jurisdictions. Evaluations of ITMS often do not go beyond simple before-and-after studies. The costs and labor required to prepare these analyses are commonly mentioned as limiting factors. This is one area where we need to do a better job in the future. The levels of automation included in ITMS should help with these evaluations. These evaluations will be needed to assist in considering future alternatives and responding to questions from decision makers.

An important function I would like to mention is providing priority to transit vehicles. This has not been given full consideration in many metropolitan areas around the country because of the adverse impacts on cross-street traffic. Through the use of traffic-adaptive control techniques, however, we should be able to enhance the operation of transit without hurting other traffic.

Traveler information represents an area that has not been exploited fully. Many areas use changeable message signs and the radio and TV media to provide information to travelers. With ATMS and ATIS, there are many new opportunities to make information available to the traveling public for pre-trip planning and in-route decisions. This is critical to really achieve the potential of ITMS.

The development and agreement among the different agencies on the traffic management strategies to be pursued is a critical step. Development of specific strategies involves resolving a number of sensitive issues relating to traffic diversion, ramp metering, incident response, accident and enforcement policies, and traveler information. Reaching an agreement on these difficult issues is critical to the development of a successful ITMS program. A traffic management matrix can be used to document these plans. Maintaining flexibility to respond to rapidly changing highway conditions during incidents is essential.

The concern about operations and maintenance has already been mentioned. This is

indeed a nationwide concern. If operating and maintaining our existing systems is a problem, just think of the problems we will face with much more complex systems in the future. The recommendations made by the FHWA panel address a number of issues in this area. These include the need for specialized ongoing training for local agency staff, additional personnel with expertise in new areas, organizational changes, and additional funding.

In conclusion, it is my view from a city perspective that we can integrate local systems with those of other agencies at the regional and state levels and still maintain adequate local control over the system. In doing this we will have to provide a greater emphasis on traffic monitoring, reach agreement among agencies on traffic management policies and approaches, implement greater automation of all needed functions, and reexamine a broader range of techniques to communicate with the traveling public. If we can do this, the pay-off will be the more efficient utilization of our roadway system at a time when we can not afford to add new highways in many metropolitan areas.

User Perspective

A. Keith Gilbert

Automobile Club of Southern California

I have been asked to discuss the benefits of ITMS from the users' standpoint, the institutional issues that will need to be addressed, and how the general public and groups like the Auto Club can better interact with state and local governments. In order to do this, I would like to start by providing you with an idea of how ITMS is viewed from the users' perspective.

Often the highway users' perspective is being stuck in traffic behind a truck without being able to see the highway signs or anything else. Further, the users' perspective in Los Angeles is often dominated by construction activities. I was pleased to note in the white papers that construction traffic management is one of the elements of ITMS. I think that Cal-