

systems, and integrated systems for up to a 2-year period. Under the Surface Transportation Program (STP), operational activities are eligible, with no time limits or specific definitions for the operational programs. This is new eligibility and something you should be examining for possible application in your area.

Certainly, the IVHS program becomes important to eventual system deployment. IVHS funds are currently being utilized in three principle areas: research and development, operational tests, and, on a limited basis, deployment. The research and development program accounts for approximately \$24 million of \$234 million available from FHWA for IVHS this fiscal year. Most of the funds focus on operational tests. The criteria to be used in evaluating potential operational tests was issued in the *Federal Register* on May 8. The strategic plan developed by IVHS America includes further goals for the program and will serve as the point of departure for future areas of emphasis. We will annually solicit for operational test partnership initiatives. Early deployment funding at a level of approximately \$5 million a year is also being provided to metropolitan areas which demonstrate a capability and interest in advancing projects such as integrated traffic management systems. As with operational tests, we will annually solicit for these deployment programs.

In closing, I would like to suggest that our challenge is to deploy integrated traffic management systems that are operationally seamless to our customer—the transportation user. The development, operation, and maintenance of these systems must be a priority. To this end, the symposium should help advance this challenge. It will, hopefully, instill fresh ideas and enthusiasm within each of us. FHWA looks forward to working with you to demonstrate the resolve of our profession to take advantage of the opportunities to deploy integrated systems. Thank you and good luck.

State Perspective

Ann Hansen

California Department of Transportation

I have been asked to provide a state perspective on ITMS. I would like to start by placing ITMS in the context of the mission described in the 1972 legislation creating the California Department of Transportation (Caltrans). This legislation stated that the mission of the department is to “provide transportation facilities and services which move people and goods at a reasonable cost and in an adequate, safe, and efficient manner.”

By way of background, it is important to note that California has spent billions of dollars in building one of the best transportation systems in the world. In the San Francisco Bay Area alone, Caltrans now has a \$20 billion investment in its freeway system. The investment in heavy rail systems like Caltrain and the Bay Area Rapid Transit System (BART) is \$7 billion. Light rail systems—San Francisco’s MUNI Metro and Santa Clara County Transit light rail transit—add another \$2.3 billion. Major bus



systems—MUNI, Golden Gate, AC, SamTrans, and Santa Clara County Transit—account for an additional \$5.5 billion. Add \$200 million for ferries, and you have \$35 billion invested in the transportation system to serve the needs of the 6.3 million people in the metropolitan area. This figure is substantially below the total cost of the system because it does not include all the money that has been spent on local streets and roads and some 20 smaller transit systems. Operating and maintenance expenses are also not included.

Unfortunately, the amount of funding available has fallen significantly behind what would be necessary to expand the system at the same rate as the growth in travel demand. In addition to the financial constraints, the social and environmental laws and concerns, primarily air quality in urban areas, will continue to limit construction of new freeways and highways severely and even the widening or improvement of existing freeways. Accordingly, the hours of delay experienced in urban areas are rising rapidly. In some areas, delay has gone up by as much as 25 percent in a 1-year period. Even with the tremendous construction program in the state, we have not been able to keep up with the demand in many areas. Continued maintenance of safety is in jeopardy. These problems exist on both local streets and roads, as well as on state highways, and some transit systems.

Although the primary responsibility of the California Department of Transportation focuses on the freeway and highway system, we are responsible to the citizens of the state to protect the investments in the existing system, maximize the carrying capacity and efficiency of the system, improve safety, reduce congestion, and improve air quality.

One of the most promising solutions for protecting this substantial public investment is through the development and operation of an integrated traffic management system. This can only be accomplished through a partnership of federal, state, regional, and local agencies along with many other groups.

One of the first things that the transportation and planning professionals have done is to establish a whole new vocabulary of acronyms which identify the traffic management system and its components. I am sure you all are familiar with many of the older acronyms like MPO, TIP, STIP, RTP, and AQMP. Some of the newer ones you will be hearing at the symposium include: TMS (traffic management system) or TOS (traffic operations system), ITMS (integrated traffic management system), IVHS (intelligent vehicle-highway system), CMP (congestion management plan), CCTV (closed-circuit television), HAR (highway advisory radio), CMS or VMS (changeable or variable message sign), EMS (extinguishable message sign), TMT (traffic management team), FSP (freeway service patrol), STP (surface transportation program), CMAQ (congestion mitigation air quality program), and TIP (federal transportation improvement program). Of course everyone is looking toward the ISTEA for funding to install ITMS and hoping it will help satisfy the requirements of the CAAA (Clean Air Act Amendments).

Earlier, I mentioned the importance of partnerships. ISTEA and recent California legislation are changing the process for planning, developing, and operating our transportation system. The planning and budgeting process is really a bottoms up rather than a tops down process, beginning with local agencies, called Congestion Management Agencies in California. These agencies are required to develop CMPs which consider the existing street and highway systems in their counties, the current levels of service, the desired levels of service, current and future land uses and their impact on the levels of service, and proposals for mitigating growth while maintaining or improving the levels of service. All projects which are to be proposed for inclusion in the regional TIP must be included in these county CMPs. The partnerships I mentioned earlier are needed to promote the cooperation and understanding necessary to develop these plans. Without this, there will not be a TMS because the necessary elements and projects will not be in the plan and ultimately may not be funded.

I believe the institutional problems associated with establishing ITMS are far greater than the technical problems. There are almost 100 cities in the San Francisco Bay Area and 9 counties. Some of these cities may have only a short freeway segment or one interchange within their city limits; but, if they want to block any portion of a TMS for parochial reasons, you are probably in trouble. You and your attorneys may think you have the authority to take an action affecting the state system, but there is always a judge or a legislator who says you don't. This can leave a lot of holes in any system, and a transportation management system with holes will not do a lot of the things we said it ought to do very well.

Metering is the most vulnerable to this thinking. Each city and county believes that the meter should be on the freeway so that the trip that originated in another jurisdiction has to wait in congestion, so that the local trip can get on the freeway without delay. The meter may take any form, either metering lights at the county or city limits or a geometric meter or bottleneck. Too few lanes to handle the demand will also do. Diverting trips off the freeway and onto local streets can also be controversial, even if it is just for a short distance or is done in response to an incident.

The equity issue is frequently raised with ITMS. Engineers can calculate how to operate the system to reduce overall delay and congestion, increase the capacity of the system, improve air quality, and identify improvements to mitigate impacts on local streets, but equity, like beauty, is in the eye of the beholder and doesn't yet fit into a computer model well. Hopefully, as people see how well ITMS can serve everyone, resistance will diminish and support will grow.

Caltrans has not accepted the reluctance of a few areas to recognize the benefits of ITMS and is proceeding ahead rapidly to upgrade and expand the systems in the Los Angeles and Orange County areas. Caltrans is also undertaking a \$200-300 million series of projects in the San Francisco Bay Area, and is making major commitments in the other urbanized areas.

Fortunately, many cities are realizing that it is important not only to keep the freeway system operating well, but also to make the local systems more efficient too. Thus, many are installing their own traffic management systems. Los Angeles and Anaheim have well-developed systems which are being expanded to increase the coordination and sharing of information with the Caltrans system. San Jose has initiated a TOS and is working cooperatively with Caltrans. Santa Ana has also requested funding for a traffic management system. Caltrans' districts are integrating their systems into regional systems and sharing information and TMTs, erasing district boundaries in traffic management.

The partnerships I mentioned previously are only a few of the many partnerships necessary to maximize the usefulness of ITMS. The coordination between different groups will be needed in many additional areas. For example, closer coordination between Caltrans and the California Highway Patrol (CHP) is being pursued. The state's traffic operations centers (TOCs) have always been staffed jointly by Caltrans and CHP. In some districts, offices which are separate from both the CHP and Caltrans main offices are being planned to be staffed by people from both organizations.

The information on highway conditions and incidents available in the TOCs is furnished directly to the media for broadcast to the public. The media also provides timely information to the TOCs. Smaller cities which are installing their own HARs are working with Caltrans to provide timely traffic information in their areas, utilizing EMSs to communicate with motorists to tune into a given radio frequency when incidents occur. Transit agencies are also expressing an interest in having a direct connection to the TOC's information system so they can adjust schedules and routes when necessary, and provide instructions to their drivers. In turn, transit vehicles can be used as probes and as a source of information on traffic conditions.

The motorist is now providing a significant amount of information to the TOCs in the form of 911 calls from cellular phones and call boxes

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.

