MEETING NOTICE
AND AGENDA

CITIES/COUNTY TRANSPORTATION ADVISORY COMMITTEE (CTAC)
The CTAC may take action on any item appearing on this agenda.

Thursday, October 7, 2010
9:30 to 11 a.m.

SANDAG, Conference Room 7
401 B Street, Suite 800
San Diego, CA  92101-4231

Chair: Maryam Babaki, City of National City
Vice Chair: Zoubir Ouadah, City of Poway
Staff Contact: Dan Martin
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AGENDA HIGHLIGHTS

• 2050 REGIONAL TRANSPORTATION PLAN: REVENUE CONSTRAINED NETWORK SCENARIOS UPDATE

• OVERVIEW OF INTELLIGENT TRANSPORTATION SYSTEMS FOR THE 2050 REGIONAL TRANSPORTATION PLAN

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To request this document or related reports in an alternative format, please call (619) 699-1900, (619) 699-1904 (TTY), or fax (619) 699-1905.
ITEM # | RECOMMENDATION
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1. | WELCOME AND INTRODUCTIONS
2. | PUBLIC COMMENTS
   Members of the public will have the opportunity to address the working group during this time.
3. | 2050 REGIONAL TRANSPORTATION PLAN: REVENUE CONSTRAINED NETWORK SCENARIOS UPDATE (Heather Werdick)
   Various Revenue Constrained transportation scenarios for the 2050 RTP have been developed using prioritized project lists and other factors. The Revenue Constrained Network Scenarios attempt to build and operate as much of the Unconstrained Network as possible, given revenue availability and flexibility and project priorities. Staff will provide an update on the initial Revenue Constrained Network scenarios and their performance. CTAC members are asked to discuss the draft Revenue Constrained Network Scenarios. The Board of Directors will be asked to select a draft Revenue Constrained Network scenario at its November meeting.
4. | OVERVIEW OF INTELLIGENT TRANSPORTATION SYSTEMS FOR THE 2050 REGIONAL TRANSPORTATION PLAN (Alex Estrella)
   Staff has completed the White Paper; Overview of Intelligent Transportation Systems for the 2050 Regional Transportation Plan, which introduces and addresses three key emerging technological advances for improving transportation system efficiency, system usage, and safety for consideration and inclusion in the 2050 RTP. SANDAG staff will present the White Paper to CTAC for information and input.
5. | CALIFORNIA DEPARTMENT OF TRANSPORTATION UPDATES
   Caltrans will provide an update on various local programs, funding program deadlines, and announcements regarding upcoming conferences.
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<td>MATTERS FROM MEMBERS</td>
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<td>CTAC members are encouraged to discuss additional topics of general interest.</td>
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<td>ADJOURNMENT AND NEXT MEETING</td>
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<td>The next CTAC meeting will be a joint meeting with the Regional Planning Technical Working Group (TWG) to be held on Thursday, October 28, 2010, from 8:30 to 10:30 a.m. in the 7th floor Board Room of the SANDAG offices located at 401 B Street, Suite 800, San Diego, CA</td>
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+ next to an agenda item indicates an attachment
OVERVIEW OF INTELLIGENT TRANSPORTATION SYSTEMS FOR THE
2050 REGIONAL TRANSPORTATION PLAN

Introduction

The draft White Paper, Overview of Intelligent Transportation Systems for the 2050 Regional Transportation Plan (RTP) (Attachment 1), provides an overview of potential technological advances that will be considered for improving transportation system efficiency, system use, and safety as part of the region’s short- and long-range goals of the 2050 RTP. The White Paper also discusses various issues, policy implications, and recommendations on next steps.

Discussion

This draft White Paper includes discussion on three key emerging technological advances within the transportation field and include: wireless sensors/detection; real-time modeling/simulation; and the IntelliDriveSM initiative. Respectively, these technologies enhance performance monitoring/planning information; provide capabilities for pro-active management based on predictive data; and introduce a new platform for safety, mobility, and environmentally focused applications.

Input is being sought on this draft White Paper from SANDAG committees and stakeholders.

Attachment 1: Overview of Intelligent Transportation Systems for the 2050 Regional Transportation Plan – Draft White Paper

Key Staff Contact: Alex Estrella, (619) 699-1928, aes@sandag.org
OVERVIEW OF INTELLIGENT TRANSPORTATION SYSTEMS
FOR THE 2050 REGIONAL TRANSPORTATION PLAN - WHITE PAPER

Introduction

Ever improving technology has the potential to help our region achieve its mobility goals. Used wisely, it can add capacity, as well as maximize the efficiency, utilization, and safety of our current transportation system. Technology is always changing and improving. While there can be some risks and additional costs to deploying new systems, the latest developments warrant a close look to see what they have to offer the San Diego region.

In the area of transportation, some of the most exciting technological advances are occurring in the area of systems management – maximizing the efficiency of existing infrastructure through careful monitoring and management of operations. In fact, systems management will be a focal point of the 2050 SANDAG Regional Transportation Plan (RTP).

Emerging technologies can immediately play a big role in improving system efficiency. Three technologies in particular have the potential to improve our region’s systems: wireless sensors/detection; real-time modeling/simulation; and the IntelliDrive\textsuperscript{SM} initiative. Respectively, these technologies enhance performance monitoring/planning information; provide capabilities for pro-active management based on predictive data; and introduce a new platform for safety, mobility, and environmentally focused applications.

This paper identifies these major trends and technologies as possible contributors to the region’s short- and long-range transportation goals over the next 40 years and beyond. In addition to specific emerging technologies, this paper also discusses various issues, policy implications, and recommendations for the 2050 RTP and future analysis.

Objectives for 2050 RTP

The objectives of this white paper for the 2050 RTP are to:

- Identify and plan for improvements necessary to support regional goals for transportation monitoring and management through technologies that enhance systems management capabilities.

- Assess the current state of technologies that improve efficiency and/or add capacity to the transportation system and include key alternatives to be discussed in the RTP.

- Develop a list of conceptual systems to be monitored for possible inclusion in future RTPs.

Background

Wireless Sensor/Detection Technology

The key goal of expanding the region’s detection system is to establish a sound platform for performance monitoring, management, and reporting. Data gathered using a comprehensive sensor and detection program will provide a better understanding of how the transportation system is performing. This understanding can then be used to determine which transportation
investments can provide the greatest mobility benefits. The information also will provide planners with the data they need to design strategies for better managing the transportation system.

Advances in wireless technology have made the deployment of these monitoring systems more feasible. The proliferation of new devices has resulted in the advent of low-cost sensors/detectors that serve as a replacement for traditional methods such as in-pavement loops. The new wave of devices reduces the cost, time, and infrastructure needed to collect data for measuring the performance of transportation systems. The information captured through this technology improves the ability to manage and attain an understanding of the operational conditions for all transportation modes, including arterials, parking, and bikeway usage. The expansion of this technology to other transportation modes/infrastructure has provided the ability to attain a more complete picture of regional and multi-modal travel patterns, and the ability to predict volume and speed flows as traffic moves from streets onto highways and vice-versa. Improved data and/or the expansion of data coverage also enhance traveler information systems by providing a more complete picture to the public.

There are many monitoring systems available, with each having its own strengths. Detection technologies such as loops, video, and infra-red are being used in transportation, some of which are still advancing. Others, such as anonymous probe data using cell phones or Bluetooth devices, are in their infancy. The benefits and costs associated with the implementation of each technology should be justified based on the specific application or project or program.

While the overall goal of collecting more data is achieved through each, the variation between the systems ranges from data quality or accuracy levels to long-term maintenance costs. The level of granularity available from fixed devices exceeds that of probe data due to the precision (lane level) that can be gained and because of the number of measurements that are captured. This level of information is needed for systems management but may exceed that needed purely for traveler information.

Similar technologies also may help in monitoring emissions. Advances in detection technology are being pursued to determine and directly monitor air quality emissions reductions and improvements through the implementation of Transportation System Management (TSM) projects. Using knowledge gained during initiatives such as the “Transportation Air Quality & Congestion Evaluation” (TRACE) project out of the State of Florida DOT, advances are being made in small, portable, air-quality monitors that can be deployed alongside of project-focused environments. These air quality monitors, measuring various levels of contaminants identified as contributing to greenhouse gas emissions (e.g., CO, NO, NOx, NO2, PM), are tracked before and after a project’s implementation, establishing a baseline and a tangible measurement of the project benefits. These sensors have now reached acceptable cost levels, making it feasible to procure and deploy them in sufficient numbers at TSM project sites.

It is important to note that, regardless of the various types of technologies available, the overall goal is to achieve a comprehensive view of all modes, transportation networks, and transportation infrastructure. Accordingly, regional focus should be placed on determining the technology that would provide the greatest benefits from a functional and cost perspective. The advent of low-cost sensors/detection provides opportunities to expand the region’s data collection network on arterials and parking, helping to establish a solid foundation for understanding the current and proposed state of the transportation system. Deployment of these detection technologies also provides the necessary performance information needed to improve system efficiency, safety, and operations for
all modes and systems, including arterials, transit, and parking facilities. The data also will enrich the quality and extent of the region’s traveler information systems.

**Real Time Multimodal Modeling and Simulation**

The use of modeling and related technology applications to support various aspects of traffic and transportation planning and analysis has been a staple in the transportation field. Such applications have focused mainly on the use of static modeling and analysis tools to support project development or transportation planning efforts. These efforts include regional travel demand forecast statistics and analysis, as well as project-specific traffic analysis. These efforts involved the use of the more traditional and established travel demand models, traffic capacity analysis applications, or micro-macro traffic simulation applications.

An emerging technology within this field is the development and implementation of real-time multi-modal modeling and simulation applications. These applications are designed to complement existing tools by extrapolating historical data and combining it with real-time data to develop dynamic decision support applications. The benefits from this technology include having the ability to forecast traffic patterns and recommend operational changes to avoid or reduce congestion. This technology allows transportation system managers to take proactive measures such as: modifying traffic signal timing, ramp meters, or speed limits; providing travelers route information and options during recurring congestion or during incidents; and analyzing and developing new transportation system management strategies and action plans.

These advances in modeling/simulation technology have proven successful in locations like Madrid, Spain and the Singapore Land Transport Authority. This technology is currently being examined under U.S. Department of Transportation (USDOT) initiatives. The key aspect is that the technology integrates off-line modeling capabilities with live, in-field systems/network sensors and/or multi-modal data feeds, forecasting transportation conditions and analyzing multiple concurrent operational scenarios to develop a recommended strategy. These systems are also being assessed and tested as new management tools to identify and measure transportation demand conditions. The information can be used to manage over- or under-utilized transportation demand in a real-time operational environment.

The application of this emerging technology will allow regional and local partners to better manage and operate the regional transportation system. Specifically, this technology has been proposed to the USDOT for demonstration as part of the Interstate 15 (I-15) Integrated Corridor Management (ICM) project. The tool is planned for development and implementation as part of the I-15 ICM traffic prediction and decision support system. The I-15 ICM project is planned for completion in 2014, and its findings and corresponding ICM applications will serve as the foundation for pursuing similar deployments along other regional corridors as part of the SANDAG Integrated Corridor Management program.

**IntelliDriveSM**

IntelliDriveSM is the USDOT program name given to a platform for advanced technologies, internationally recognized as significantly improving roadway performance, increasing safety, and providing environmental benefits. Through the development of a ubiquitous high-speed communications network, the IntelliDriveSM platform leverages and advances the intelligence of vehicles to enable an entirely new suite of applications that significantly change transportation networks and systems management. The USDOT’s initiative for this emerging technology is
approaching formal adoption and deployment and should be included in the region’s transportation plan.

The core of the IntelliDrive℠ Program delivers a communications network that addresses safety, traffic management, and traveler applications by enabling vehicle-to-infrastructure and vehicle-to-vehicle communications. The USDOT formally adopted the initiative in 2004, under the banner of the Vehicle Infrastructure Integration (VII). The Automated Highway System (AHS) and Intelligent Vehicle programs, from the 1990s, are responsible for delivering much of the foundation research, Federal Communications Commission (FCC) licensing, and standards development activities required to make the IntelliDrive℠ platform a success.

The capabilities and benefits of intelligent vehicles are embodied within IntelliDrive℠, including the primary function of improving safety while also incorporating mobility and environmental enhancements. The USDOT, private industry, and educators are strong supporters of IntelliDrive℠ application capabilities to reduce the 42,000 annual highway fatalities by increasing the intelligence of vehicles to include awareness of other vehicles and their speeds; the status of traffic signals and road conditions; and detail mapping for determining curve/speed ratios and warnings. While the initial deployment of IntelliDrive℠ will likely focus mostly on assistive functions along with braking and throttle control, the exchange of information between intelligent vehicles and an intelligent infrastructure will provide a platform for more autonomous functions.

The IntelliDrive℠ platform and vehicles enable our transportation system managers to receive and send enhanced decision quality data to vehicles about the status of the network, allowing greater control to increase throughput and manage congestion. IntelliDrive℠ will have a core role in Traffic Management optimization, resulting in the reduction of approximately 1.7 million hours of delay, 1.1 million gallons of gasoline saved, and 9,600 tons of CO2 emissions per year once the full deployment is reached between 2020-2025.

IntelliDrive℠ provides the ability for vehicles to communicate with each other and with roadway infrastructure devices. It enables vehicles to transfer message sets for safety, traffic management, and traveler information conditions. It provides awareness of other vehicles and their speeds; the status of traffic signals and road conditions; and detail mapping for determining curve/speed ratios and warnings.
IntelliDrive℠ also has been positioned and promoted as the new platform for a nationwide tolling standard. This standard would potentially reduce costs related to infrastructure deployment and ongoing operation by eliminating transponders, leveraging a common platform, and introducing more competition. The integration of new IntelliDrive℠ applications with vehicle systems also has the capability to introduce new enforcement and pricing strategies for carpool lanes and High Occupancy Toll (HOT) lanes by detecting the number of occupants in the vehicle.

A few key regions/agencies, including the Metropolitan Transportation Commission in the San Francisco Bay Area and the Michigan Department of Transportation, have functioned as the leaders in evaluating the potential of IntelliDrive℠. These regions have deployed operational test beds through partnerships with the Federal Highway Administration and various firms from private industry to explore the potential of IntelliDrive℠ to improve safety and enhance mobility. Their findings to date have been promising and regions are in the process of expanding their efforts and increasing their investments in the technology.

The USDOT’s Joint Program Office has announced that IntelliDrive℠ is its highest priority program and is in the process of establishing formal working groups with state and local agencies to complete planning and expand pilot deployments. The USDOT envisions broad deployments of IntelliDrive℠ by 2014 as part of its ITS Strategic Research Plan, approved by the ITS Management Council in December 2009. To this end, the USDOT has engaged with both national and international industry bodies to deliver a robust technology environment within which IntelliDrive℠ will come to fruition on schedule. The Institute of Electrical and Electronics Engineers (IEEE), Society of Automotive Engineers (SAE), and American Association of State Highway and Transportation Officials (AASHTO) have worked over the last six years to solidify standards for industry certification to ensure that robust deployment strategies and plans are available.

Discussion

Issues and Policy Implications

Several components of these emerging technologies present particular challenges for the region. These include:

- The IntelliDrive℠ initiative is a very large undertaking with various detailed and high-level issues still to be addressed. Detail items pertaining to technical issues such as the communications protocol and frequency are highly debated, with consensus solutions likely to come from the academic community and private industry in time.

- Agencies that position themselves on the cutting edge may be forced to cope with some disadvantages, such as increased costs for research and development.

Recommendations

For RTP Update

- Include a discussion of IntelliDrive℠, detection, real-time multimodal modeling, and simulation as emerging technologies with the potential to improve transportation system management.

- Include recommendations on issues such as costs associated with research and development, infrastructure investment and phasing, privacy issues, ongoing maintenance, and operational funding.
• Include a listing of ITS investment strategies that will be consistent with, and complement, the ITS Strategic Plan.

• Monitor other emerging technologies for inclusion in future updates of the RTP. Specifically, make it SANDAG policy to include a review of emerging technologies as an element in all future RTPs.

**For Future Analysis**

SANDAG will work to secure federal, state, and local funds, and formalize public-private partnerships to achieve two emerging technology goals:

• The establishment of an IntelliDrive℠ Validation Corridor.

• The deployment of detection and real-time multimodal modeling and simulation technologies for a field operations analysis of near- and long-term benefits for improving system efficiency, safety, and multi-modal network operations and management.

SANDAG will work to secure funds – including planning grants – to conduct a more detailed study of the advantages and disadvantages of emerging transportation technologies in anticipation of the next RTP update.
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2009 USDOT-Research and Innovative Technology Administration / ITERIS (2009); "National ITS Architecture - Emission Testing and Mitigation"
Real Time Multi-Modal Modeling and Simulation


IntelliDrive™


