EXECUTIVE SUMMARY
Intelligent Transportation Systems (ITS) Strategic Deployment Plan (SDP) for the Sacramento Region

Prepared for:

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Executive Summary

This executive summary is a high-level overview of the *Intelligent Transportation Systems Strategic Deployment Plan* for the Sacramento Region. For technical details and further discussion please refer to the main report and appendices, which are available at the SACOG ITS Strategic Deployment Plan website at http://www.sacog.org/websites/kimley-horn/.

This executive summary contains the following sections:

- Background of the Strategic Deployment Plan and Intelligent Transportation Systems (ITS)
- Key Project Stakeholders
- Goals for Regional Growth
- Key Results of the Strategic Deployment Plan
- Mainstreaming Advanced Technology into planning and project development initiatives
- Outline of the Strategic Deployment Plan
- Steps for Successful Implementation of the Strategic Deployment Plan

What is ITS?

For stakeholders who are unfamiliar with the advanced technologies of Intelligent Transportation Systems, the following is a general definition of ITS:

Intelligent Transportation Systems (ITS) are a collection of roadway, transit, communications, and computer technologies that are used to improve the operation of roadway and transit systems. ITS make real-time traveler information available to the public so that better decisions can be made about when and how to travel. Freight and business services are improved with the ability to monitor roadways and re-route vehicles if necessary. ITS also improve mobility and safety for pedestrians and bicyclists using technologies that detect and adapt intersection signals for these travelers. While much of the ITS technologies are "behind the scenes," some examples that can been seen around the region include: ramp meters on highway on-ramps, message signs, video cameras, enhanced bus service, and 511.

Introduction

The *Intelligent Transportation Systems Strategic Deployment Plan for the Sacramento Region* is a planning document that defines how advanced technologies can support the transportation and land use planning initiatives in the region to help planners to achieve the region's planning objectives. Results of the Strategic Deployment Plan will help determine how and when to incorporate advanced technology in transportation projects, and which technologies to use. By integrating the Strategic Deployment Plan with other regional planning initiatives such as the Sacramento Region Blueprint and the Metropolitan Transportation Plan, and by incorporating lessons learned when other agencies deploy similar technologies, the planning partners can realize the benefits from coordination, shared investments, and multimodal integration while working towards common regional goals. The Strategic Deployment Plan suggests some tools and techniques for including advanced technologies in the planning and deployment stages of regional development, and key strategies for building upon the existing regional advanced technology framework.

The central principle of the project is the interrelation of Intelligent Transportation Systems (ITS) with transportation and land use planning. All of these areas of development are ultimately concerned with region-wide effectiveness in achieving broad standard-of-living goals related to growth, mobility, accessibility, convenience, and safety. Considering alternate mode mobility in every development encourages developers to incorporate design elements which are more inclusive (for example, more pedestrian-friendly entrances or walkways to transit). Linking transit operations to jobs, services and housing is another key consideration in projects, affecting the planning of both (for example, modification of transit routes as need grows due to new developments, or guiding development to first take advantage of proximity to transit corridors). A useful resource considering ITS deployment strategies for sustainable and livable communities is *Roads Less Traveled* published by Public Technology, Incorporated (PTI) and available from FHWA at http://www.fhwa.dot.gov/tfhrc/safety/ pubs/its/generalits/rdless.pdf.

Advanced technologies can take many forms including the areas of traffic monitoring, data collection and dissemination, safety, transit service, and walkability/bikeability. These technologies and solutions are meant to supplement other transportation projects to enhance the benefits being provided by the transportation system. A few examples of advanced technologies are shown in **Figure 1** on the following page.

Figure 1 – Examples of ITS Technologies

Bicycle and Pedestrian Solutions

Pedestrian Crossing Signal Head

Pedestrian Crossing Detection

Bicycle Video Detection

Traveler Information

Sacramento Region 511

Changeable Message Sign

Real-Time Train Arrival and Departure Times

Transit

Queue Jumper Lane

Electronic Fare Collection

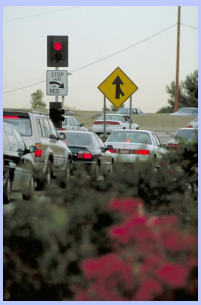
Bus Rapid Transit

Roadway Management

CCTV Camera

Transportation Management Center (TMC)

Ramp Metering



Stakeholders

Throughout this project process, many stakeholders were solicited for input through a consistent outreach effort. The wide range of stakeholders included cities, counties, SACOG, Caltrans, transit agencies, environmental groups, bicycle and pedestrian coalitions, citizen groups, transportation and land use planners, engineers, consultants and concerned residents. Anyone having an interest in deployment of technology in transportation projects participated in the project. Transportation agencies and organizations in charge of planning, building and operating transportation systems in the region were especially encouraged to attend.

The intent of including non-ITS stakeholders was to bring advanced technology to the forefront of consideration when other smart growth and capital improvements are being planned. This project raised the awareness among non-ITS stakeholders of the benefits that can be achieved by including advanced technology in planning and development activities as a way to achieve the smart growth objectives of the region.

Principles for Regional Growth

Where and how does the region expect to grow in 10 years, 20 years, and beyond?

As part of the Metropolitan Transportation Plan, the region has already developed ten overarching transportation-related goals which were used as the basis for the region's ITS Vision developed by the ITS Partnership. The goals emphasize quality of life, which in the context of transportation and advanced technologies pertains to improving air quality, enhancing transit service, improving alternate mode opportunities (bicycles, walking, transit), and improving mobility along major corridors. In addition, ITS can support Homeland Security initiatives in preparing for, preventing, and monitoring terrorist activities by creating a safer and better-equipped transportation network. Throughout the Strategic Deployment Plan development, these transportation-related goals helped assess the status of the region's current planning outlook and guided the prioritization of projects.

The Sacramento Region Blueprint: Transportation and Land Use Study evaluated and created a scenario for how the region expects to grow to the year 2050. The emphasis was on **Smart Growth principles** such as the following, reflected throughout Blueprint and throughout numerous General Plans, to guide future development:

- Provide a variety of transportation choices
- Take advantage of compact development
- Use existing assets
- Mixed land uses especially near transit
- Encourage distinctive, attractive communities with quality design

The goals of these two initiatives, the MTP and Blueprint, were closely considered as the Strategic Deployment Plan was prepared. The first place that these goals are discussed is with the Updated **ITS Vision**. Each ITS Vision goal was expanded to include a list of objectives that can help achieve those goals. This was an interim step that fed into the Gap Assessment to determine whether the ITS Vision of the region was being fulfilled.

Overarching ITS Priorities

The stakeholders provided input regarding the types of ITS applications they wanted to see in the Sacramento Region and which ones they felt were more important than others. Based on the discussions, the following high level applications are guidelines for future ITS enhancement and focus in the region:

- **Completion of STARNET Wide Area Network** – *Provide communications link between agencies to allow exchange of data and video.*
- **Expand 511 traveler information** – *Provide additional traveler information services to the public such as multimodal route planning and guidance.*
- **Transit Service Enhancements (Automatic Vehicle Location/GPS systems)** – *Enable Bus Rapid Transit (BRT); and provide the ability to broadcast real-time vehicle location and stop arrival information.*
- **Bicycle and pedestrian projects** – *Enhance safety of alternative modes for reliable mobility.*
- **Additional SMART Corridors** – *Provide traffic monitoring capabilities along major arterials; enable Bus Rapid Transit (BRT).*
- **Enhanced transportation system operation** – *Enhance signal operations (timing) and proactive traffic management activities.*
- **Freight Movement** – *Provide coordinated operations between transportation management and freight operations to enhance goods movement through the region.*
- **Emergency Service Coordination –** *Provide coordinated planning and operations of incident management between emergency services and traffic management.*

Key Results of the Strategic Deployment Plan

The strategic deployment of advanced technology will help the Sacramento region realize the objectives and goals articulated above. While advanced technologies can be deployed as stand-alone project, the greatest benefits can be seen when they are deployed in conjunction with other capital improvement projects. Advanced technologies are not meant to drive development. There are four key elements of the Strategic Deployment Plan that provide tools to assist the stakeholders in deploying advanced technologies to facilitate the smart growth initiatives of the region.

ITS Solutions Toolbox

How do stakeholders know how and when to deploy technologies? Which technologies should be deployed and how much will they cost? The ITS Solutions Toolbox was developed as part of the Strategic Deployment Plan to be used as a quick reference tool for planning and programming decision-makers. This set of two tables offers possible technology solutions, descriptions, and deployment considerations; and planning level cost estimates for installation, operations, and maintenance for every type of advanced technology. The first table identifies the type of ITS solutions that can be considered for various types of capital improvement projects. The second table expands on those solutions to identify additional issues as an ITS solution is considered. This Toolbox provides a good starting point and high-level comparison tool for stakeholders considering the deployment of advanced technology.

A sample of the Toolbox is shown in **Figure 2** below; the full table appears at the end of **Section 6** of the Strategic Deployment Plan.

Figure 2 – Sample of ITS Solutions Toolbox (Bicycle Detection)

Project Types	Solution Descriptions	Deployment Considerations	Unit Cost	O & M Cost Per Year
• Bicycle Lanes • At-Grade Trail Crossings • Traffic Signals • Traffic Signal Modifications	Detection device, cabling to signal cabinet, power to detect bicycles at intersections	• Detection technology (in-pavement vs. non-intrusive).	$3,000-$10,000 per location	$1,000 per location

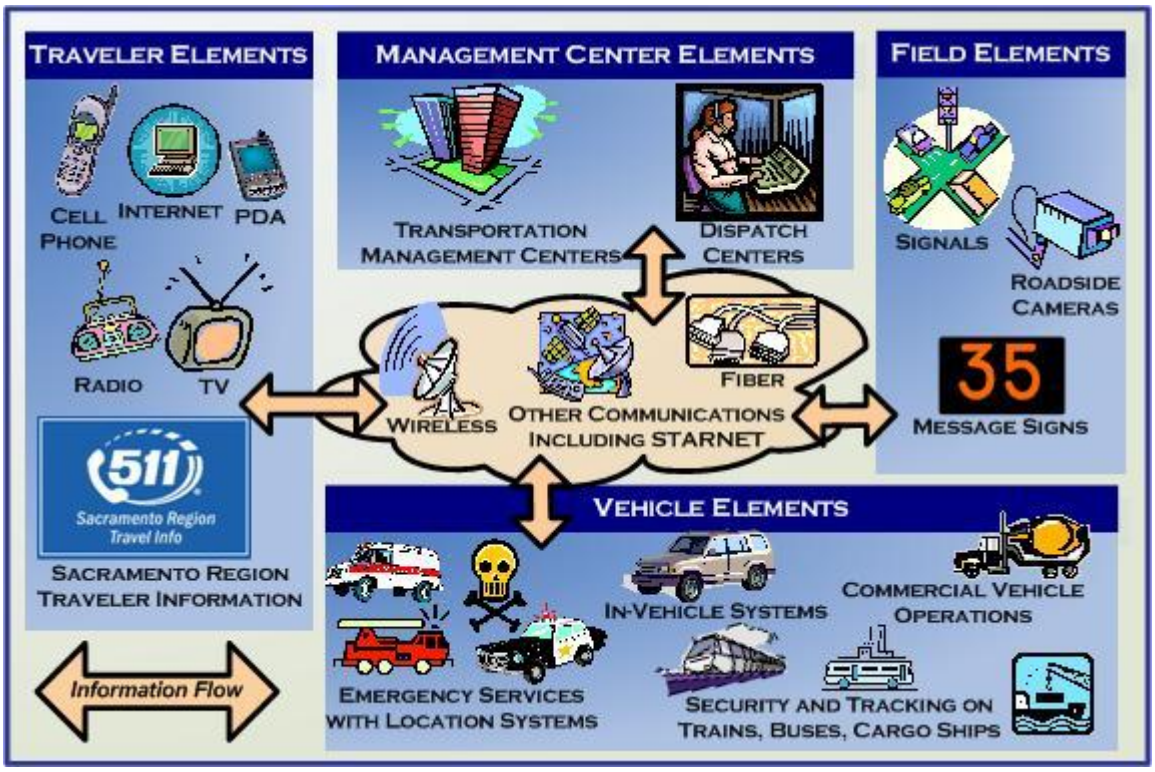
Cost Considerations	Benefits to Project or Agency (of Concurrent ITS Deployment)	Benefits to Public (of ITS Deployment)
Depends on technology and installation/ mounting requirements	• If added to another project, disruption to traffic is minimized • Reliable source of traffic data	• Real-time traffic flow data could be available • No privacy issues compared with other technologies

- ITS Architecture

The ITS Architecture is a process that defines how agencies and systems are interrelated or interconnected. There is a national level architecture, a California statewide architecture, and regional and local architectures throughout the state. Once an ITS Architecture is defined, it helps planners and project developers ensure that a complete system is deployed, rather than just an individual component, and it helps ensure that adjoining systems are compatible. Establishing and following an ITS architecture will increase the consideration for federal ITS funding.

The diagram presented below is a simplified version of **Figure 4.2** of the Strategic Deployment Plan.

Figure 3 – Simplified Regional ITS Architecture



Gap Assessment

As part of the Strategic Deployment Plan, the prior state of ITS in Sacramento was assessed. With a focus on the ITS Vision and existing, planned, and programmed projects, there are several key observations that became the emphasis of the deployment plan based on stakeholder input.

- Additional opportunities need to be identified to include ITS solutions in more bicycle and pedestrian projects.
- New projects have been defined in **Section 7** of the Strategic Deployment Plan for ITS Vision objectives that do not currently have an existing, planned, or programmed project that matches that objective including:
  - Improve access to and reliability of alternate modes;
  - Improve bicycle and pedestrian safety;
  - Provide traveler information in accessible formats (i.e., large print, Braille, 711, audio, multi-lingual) and varying media (i.e., web, TV, in-vehicle, 511, kiosks);
  - Develop an ITS education program in the region;
- New projects have been defined in **Section 7** of the Strategic Deployment Plan for elements of the ITS Architecture where projects have not been defined in the Sacramento region:
  - Transit Maintenance (APTS06)
  - Emissions Monitoring and Management (ATMS11)
  - Standard Railroad Grade Crossing (<80 mph) (ATMS13)
  - HAZMAT Management (CVO10)
  - Transportation Infrastructure Protection (EM05)
  - Evacuation and Reentry Management (EM09)
  - Work Zone Management (MC08)
  - Work Zone Safety Monitoring (MC09)

Early Winner Projects

"Early Winners" are projects that can be implemented almost immediately if funding is available; or projects that have recently been completed that offer benefits to the region. These projects have little or no external conflicts or dependencies. The focus of early winner projects for the Strategic Deployment Plan is to identify projects that will serve a regional benefit. These Early Winner projects are described in further detail in **Section 7.2**.

Early Winner projects include:

Project #1 – STARNET Systems Engineering Report and Implementation
Project #2 – Sacramento 511 Traveler Information System
Project #3 – Elk Grove communication connection to future STARNET
Project #4 – Folsom communication connection to future STARNET via 50-Fig
Project #5 – Roseville backbone connection to Citrus Heights for future STARNET
Project #6 – Extension of Regional Transit Backbone
Project #7 – Arden Way ITS
Project #8 – Watt Avenue Smart Corridor
Project #9 – Caltrans Fiber Interconnect Project to future STARNET
Project #10 – Stockton Boulevard Enhanced Bus

Project Prioritization

The Sacramento ITS Strategic Deployment Plan includes project prioritization defined by the stakeholders. It identifies the recommended order of deployment of ITS central systems, projects, or infrastructure based on stakeholder preference according to the following categories:

- Short-Term Projects (currently deployed or planned for deployment in the next 5 years);
- Mid-Term Projects (considered for deployment in the 5-10 year timeframe);
- Long-Term Projects (considered for deployment in the 10-20 year timeframe); and
- Not planned for deployment at this time.

The following is a select summary list of the types of high-priority projects for the Sacramento Region. This information was taken from **Section 7.1** of the Strategic Deployment Plan:

High-Priority Projects (Short-Term)
• Develop interagency communications via STARNET
• Expand existing 511 traveler information system
• Expand Caltrans Traffic Operations System with ramps meters, closed-circuit television cameras, changeable message signs, and vehicle detection along strategic freeway corridors
• Enhance transit safety and operations through increased surveillance and improved services by deploying queue jumper lanes, automatic vehicle locating, and transit priority
• Improve pedestrian and bicycle safety and mobility by deploying equipment to raise awareness of pedestrian presence
• Expand local fiber and copper communications infrastructure
• Construct traffic management centers
• Commercial Vehicle Operations - Goods Movement

Mainstreaming Advanced Technologies

"Mainstreaming" refers to an intentional process to systematically and strategically include advanced technologies in all aspects of transportation and land use planning whether it is being done on a local, corridor or regional level, or specifically tied to projects. The goal of mainstreaming is to ensure that technology strategies are an integral component of the metropolitan transportation planning and programming process and are incorporated into the Metropolitan Transportation Plan (MTP) and Metropolitan Transportation Improvement Program (MTIP).

Strategies that assist in "mainstreaming" ITS include the use of committees with regional stakeholders; education of policymakers, staff and the public; inclusion of ITS in planning documents; a program of regional projects; and methodologies to encourage consideration of advanced technology into transportation investment alternatives.

There are a number of additional steps that can be taken to raise the consideration level of advanced technologies with other transportation opportunities, including:

1. Utilize the priority list presented in **Section 7** of the Strategic Deployment Plan to program projects that will capitalize on the benefits of advancing the ITS program in the region.
2. Develop an awareness and education program on the benefits of ITS in general and specifically on projects deployed in the region.
3. Link ITS solutions to the Blueprint Preferred Scenario using the ITS Solutions Toolbox.
4. Utilize the ITS Solutions Toolbox in all planning and programming activities.
5. Incorporate components of the SDP into the main body of the next Metropolitan Transportation Plan with a focus on outcomes that benefit users of the system.
6. Schedule a joint meeting of the ITS Partnership and Regional Planning Partnership at least annually.
7. Consider separating the ITS Partnership into two groups – a technical working group and a policy steering group and identify the roles of each group.
8. Create incentives for incorporating and maintaining advanced technology solutions in the MTP and MTIP projects that can demonstrate a measurable outcome.

Outline of the Strategic Deployment Plan

Many of the sections found in this Strategic Deployment Plan are consistent with the federal guidelines. There are also several sections that make this plan unique. The individual elements of the Strategic Deployment Plan project are outlined below and can be found on the project website at http://www.sacog.org/websites/kimley-horn/.

- **Section 2: Updated ITS Vision Statement** describes the updated Sacramento region's ITS Vision (Goals and Objectives) based on input from a representative cross-section of stakeholders.
- **Section 3: Gap Assessment** summarizes existing, planned and programmed ITS deployments and how they fit in with the ITS Vision and ITS Architecture, so that "gaps" can be identified.
- **Section 4: Sacramento Regional ITS Architecture** completes the initial effort of the 2001 Sacramento Regional ITS Architecture.
- **Section 5: Plan Maintenance** outlines an ongoing maintenance strategy for the Sacramento ITS architecture to ensure that the Strategic Deployment Plan is implemented and kept up-to-date.
- **Section 6: ITS Solutions Toolkit** provides a useable decision-making tool for ITS planners and deploying agencies in the Sacramento region.
- **Section 7: Deployment** outlines prioritized Sacramento region projects, benefits, and costs, along with a discussion of the recommended stakeholder agreements.
- **Section 8: Next Steps** highlights recommendations and future actions for ITS deployment based on the inputs of the Strategic Deployment Plan process.
- **Appendices** provide detailed results and summaries of stakeholder input and other data.
    - **APPENDIX A: Outreach Plan**
    - **APPENDIX B: Sacramento Region ITS Vision Update**
    - **APPENDIX C: Existing Conditions Summary Report**
    - **APPENDIX D: Project Inventory**
    - **APPENDIX E: Gap Assessment**
    - **APPENDIX F: Performance Criteria**
    - **APPENDIX G: Market Packages mapped to Elements**
    - **APPENDIX H: Customized Market Package Diagrams**
    - **APPENDIX I: Equipment Packages mapped to Elements**
    - **APPENDIX J: Functional Requirements by Elements**

The flowchart below in **Figure 3** demonstrates how the SACOG Blueprint, the Metropolitan Transportation Plan, and the Strategic Deployment Plan interrelate to result in a unique process that promotes integrated, coordinated planning and project development in the Sacramento region. While some plans are more oriented toward land use planning (shown in pink), others are oriented more toward transportation planning (shown in blue). Nonetheless, all of these planning documents have an impact on each other and take into account transportation and land use efforts.

Steps for Successful Implementation

As with other recent regional planning documents, this report can be an active resource that builds upon other major regional planning initiatives such as the Sacramento Region Blueprint and the Metropolitan Transportation Plan. To continue making progress toward transportation-related and land use-related Goals developed in the initial stages this project, the following Next Steps are suggested:

- MOU: Execute a Memorandum of Understanding as soon as possible for implementing the Strategic Deployment Plan.
- Early Winners: The responsible agencies should follow up on Early Winner projects in their jurisdiction to identify opportunities to provide greater benefit and cost savings by implementing them.
- Commercial Vehicle Operations (CVO): As ITS mainstreaming moves forward, engage stakeholders from freight agencies and goods movement organizations (such as the Port of Sacramento).
- Feed into Blueprint Next Steps: The ITS Solutions Toolbox should be linked to, or be adopted as one of the "tools" in the Blueprint Toolbox.
- Maintenance: Execute the conditions of the ITS Maintenance Plan to ensure that the ITS Architecture will continue to be updated.
- Mainstreaming: As part of the ITS Partnership or other group of stakeholders, set a schedule for discussing the Strategic Deployment Plan on a regular basis to ensure success.

Figure 3 – Interrelationships of Planning Documents in Sacramento Region