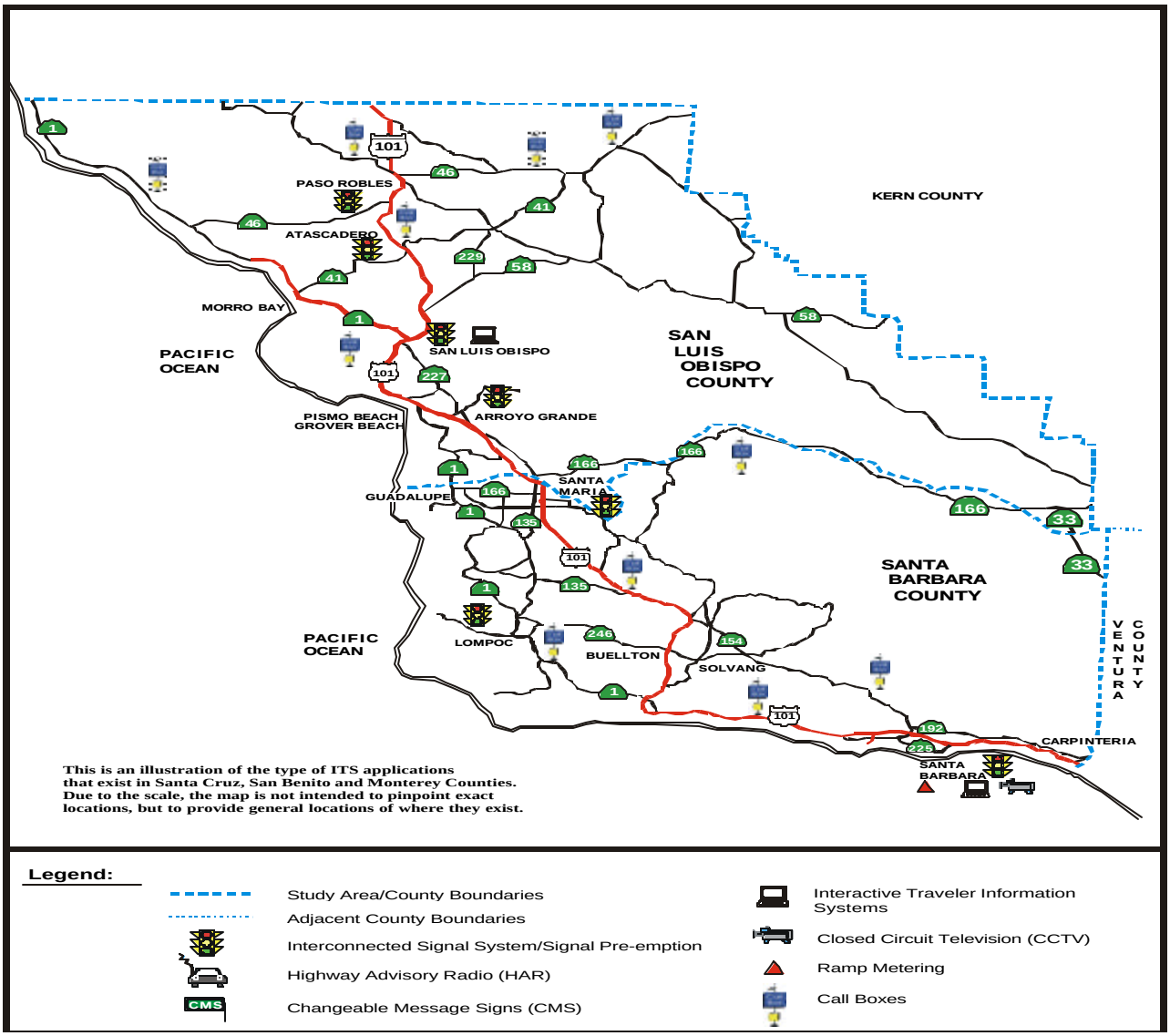
Best Practices of Rural and Statewide ITS Strategic Planning



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16. Abstract

The "Best Practices of Rural and Statewide ITS Strategic Planning" document investigates the transferability of rural and statewide ITS planning efforts to other locations and provides "lessons learned" during the ITS planning process in many locations. The goal of this document is to identify factors that should be considered by agencies undertaking rural and statewide ITS planning projects. It describes factors that should be examined if components of successful rural and statewide ITS planning efforts are to be transferred and replicated elsewhere. It also documents the benefits of rural and statewide ITS planning so that these benefits can encourage future ITS strategic planning efforts nationwide.

The primary objective of this document is to capture and document best practices rural and statewide ITS planning and to present an overview of the "typical" ITS planning process. To do this, 12 in-depth case studies and 18 shorter survey forms were developed to record and analyze the opinions, views, and experiences of the people involved in each ITS planning initiative and to derive recommendations and pointers that can be adapted for future projects. This document addresses more institutional rather than technical issues; its emphasis is on the complex decision-making processes required for the ITS strategic planning. This process includes agency interactions, processes and procedures, organizational structures, and institutional involvement.

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TABLE OF CONTENTS

PAGE

1. INTRODUCTION 1-1
Best Practices – Background 1-1
Best Practices – Purpose 1-1
Best Practices – Scope 1-2
Best Practices – Target Audience 1-3
2. METHODOLOGY 2-1
Project Approach 2-1
Case Studies 2-1
Survey Forms 2-3
Prepare Best Practices Document 2-5
3. ITS STRATEGIC PLANNING PROCESS 3-1
Introduction 3-1
What is an ITS Strategic Plan? 3-1
Characteristics of an Effective ITS Planning Process 3-1
What is a Regional ITS Architecture? 3-2
Why Develop a Regional ITS Architecture? 3-4
How to Develop a Regional ITS Architecture 3-4
4. GOALS & OBJECTIVES 4-1
Introduction 4-1
Reasons for Conducting an ITS Strategic Plan 4-1
Why Update an Existing ITS Strategic Plan? 4-2
5. STAKEHOLDER PARTICIPATION 5-1
Introduction 5-1
Organization, Coordination, and Management 5-1
Successful Tactics for Generating Stakeholder Participation 5-2
6. OUTREACH, EDUCATION, & MARKETING ACTIVITIES 6-1
Introduction 6-1
Best Practices 6-1
7. FUNDING OPPORTUNITIES & SOURCES 7-1
Introduction 7-1
Mainstreaming ITS 7-1
Potential Federal Funding Sources 7-1
Private Funding Potential 7-2
8. OPERATIONS, MAINTENANCE, & MANAGEMENT CONSIDERATIONS 8-1
Introduction 8-1
Early Consideration of O&M 8-1
Agency Capabilities and related costs 8-1
O&M Responsibilities 8-2
O&M Costs 8-2
Other Costs 8-2
9. COSTS 9-1
Introduction 9-1
Strategic Plan Cost/Level-of-Effort 9-1
Public Sector Level of Effort 9-3
Private Sector Prices 9-4

Planning Level Cost Estimates 9-6
10. POTENTIAL BENEFITS 10-1
Introduction 10-1
How Benefits were Determined 10-1
Benefits of Conducting an ITS Strategic Planning effort 10-2
11. GUIDANCE HIGHLIGHTS FROM CASE STUDIES 11-1
Introduction 11-1
Strategic Planning -- Overview 11-1
perform Regional Inventory & Define needs 11-2
Develop ITS Vision 11-3
Identify/Screen Market Packages & ITS Concept Plan 11-3
Identify Desired Functional Capabilities & Potential Projects 11-4
Define ITS Regional Framework Including Architecture 11-4
Define Operational & Implementation Strategies 11-5
Regional ITS Implementation Program 11-5
Outreach Activities 11-5

LIST OF EXHIBITS

Exhibit 1.1 - Best Practices Document Contents 1-3
Exhibit 2.1 – Case Study Location and Scope of Plan 2-1
Exhibit 2.2 – Information collected for each Case Study 2-2
Exhibit 2.3 – List of Regions or States that were surveyed 2-3
Exhibit 2.4 – List of Questions Included in Each Survey 2-4
Exhibit 3.1 – Planning Process Frequently Used for ITS Strategic Plans 3-3
Exhibit 9.1 - Level of Effort and Price for Strategic Planning 9-3
Exhibit 9.2 - Public Sector Cost Level –of Effort 9-4
Exhibit 9.3 - Private Sector Contract Value 9-4
Exhibit 9.4 - Cost Estimates to Complete ITS Strategic Planning Effort 9-5

List of Appendices

APPENDIX A – IN-DEPTH DESCRIPTION OF CASE STUDY PROJECTS

APPENDIX B – PROJECT SURVEY FORMS

APPENDIX C – CASE STUDY AND SURVEY FORM RESULTS SUMMARY

LIST OF COMMON ABBREVIATIONS AND ACRONYMNS

ITEM	DESCRIPTION
APTS	Advanced Public Transportation Systems
ATIS	Advanced Traveler Information Systems
ATMS	Advanced Transportation Management Systems
CAD	Computer Aided Dispatch
Caltrans	California Department of Transportation
CCTV	Closed Circuit Television
CHP	California Highway Patrol
CMS	Changeable Message Sign
COG	Council of Governments
COTS	Commercial-Off-The-Shelf
CRC	Castle Rock Consultants
CVO	Commercial Vehicle Operations
DMS	Dynamic Message Sign
DOT	Department of Transportation
DPW	Department of Public Works
EMS	Emergency Medical Services
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HAR	Highway Advisory Radio
HazMat	Hazardous Materials
ISP	Information Service Provider
ISTEA	Intermodal Surface Transportation Efficiency Act (1991)
IT	Information Technology
ITS	Intelligent Transportation Systems
MOE	Measure-of-Effectiveness
MOU	Memorandum-of-Understanding
MPO	Metropolitan Planning Organization
NPRM	Notice of Proposed Rulemaking
NWS	National Weather Service
O&M	Operations and Maintenance
PCB	Professional Capacity Building
RFP	Request for Proposal

ITEM	DESCRIPTION
RTIP	Regional Transportation Improvement Plan
RTPA	Regional Transportation Planning Agency
SAIC	Science Applications International Corporation
SDO	Standards Development Organization
STIP	Statewide Transportation Improvement Plan
TCS	Traffic Control System
TEA-21	Transportation Efficiency Act for the 21st Century
TIP	Transportation Improvement Plan
TMC	Transportation Management Center
TransCore	TransCore ITS, Inc.
U.S. DOT	United States Department of Transportation
VMS	Variable Message Sign
WTI	Western Transportation Institute (Montana State University - Bozeman)

1. INTRODUCTION

BEST PRACTICES – BACKGROUND

In recent years, it has become increasingly common for states and regions across the country to consider Intelligent Transportation Systems (ITS) solutions to meet the transportation needs of their rural and small urban areas. Some of the most progressive states also have examined these opportunities from a statewide perspective. However, while there is a growing body of experience in planning, developing, and deploying ITS, this experience is not being shared effectively among all potential user groups. Consequently, each group that embarks on these efforts typically starts from scratch and proceeds without the benefit of experience garnered on similar efforts.

In order to make this body of experience more accessible, the United States Department of Transportation (U.S. DOT) commissioned the development of Best Practices on the planning, development, and deployment of Rural ITS. The purpose of this document, *Best Practices of Rural and Statewide ITS Strategic Planning*, is to support those agencies and groups that are beginning the process of Rural or Statewide ITS deployment planning. Documenting past efforts will support the transferability of ITS planning steps that "make sense" to other locations and in so doing help identify and avoid or mitigate problems that have been encountered elsewhere. In this manner, the best practices document can make a positive impact in the transportation industry and contribute greatly to improving future rural and statewide ITS planning efforts.

BEST PRACTICES – PURPOSE

The rural ITS best practices series consists of two (2) main components:

- A previously published Rural Toolbox (or resources document) that identifies successful Rural ITS Projects and Statewide ITS planning initiatives from across the country (available as publication number FHWA-OP-01-030)
- This best practices document that guides users through proven processes for the preparation of a rural or statewide ITS deployment plan

This document is the second of these components, the best practices document. It investigates the transferability of rural and statewide ITS planning efforts to other locations and provides "lessons learned" during the ITS planning process in many locations. The best practices document's ultimate goal is to identify factors that should be considered by agencies undertaking rural and statewide ITS planning projects. This document describes factors that should be examined if components of successful rural and statewide ITS planning efforts are to be transferred and replicated elsewhere. It also documents the benefits of rural and statewide ITS planning so that these benefits can encourage future ITS strategic planning efforts nationwide.

The U.S. DOT is actively promoting the planning and deployment of ITS as directed within the Transportation Efficiency Act for the 21st Century (TEA-21). In order to more effectively advance ITS deployment throughout the country, the U.S. DOT has developed a plan for ensuring that the national transportation workforce is adequately prepared for this task. This effort includes a number of components such as the Professional Capacity Building (PCB)

program, the Technical Assistance program, and the ITS Peer-to-Peer program. Each of these programs encompasses a wide variety of instructional, guidance, and training tools aimed at educating the public, transportation practitioners, and elected officials about ITS.

Furthermore, in April 2001, Part 940 of Title 23 in the Code of Federal Regulations became active. The regulation seeks to foster integration through the development of a regional ITS architecture tailored to address the local situation, ITS investment needs, and the subsequent conformance of ITS projects to the National ITS Architecture and appropriate standards. To this end, the U.S. DOT has developed the *Regional ITS Architecture Guidance* document (available as publication number FHWA-OP-02-024)[1] to assist stakeholders in developing, using, and maintaining an ITS architecture for their region.

Working together with these other programs, rules, and documents, this best practices document promotes a number of common ITS themes such as inter-agency involvement and cooperation, regional planning and deployment needs, and desired integration strategies as the foundation for subsequent rural ITS planning, development, and deployment activities.

BEST PRACTICES – SCOPE

The primary objective of the Best Practices Document is to capture and document rural and statewide ITS planning and to present an overview of the "typical" ITS planning process. To do this, 12 in-depth case studies and 18 shorter survey forms were completed to record and analyze the opinions, views, and experiences of the people involved in each ITS planning initiative and to derive recommendations and pointers that can be adapted for future projects. This document addresses more institutional rather than technical issues; its emphasis is on the complex decision-making process required for ITS strategic planning. This process includes agency interactions, processes and procedures, organizational structures, and the level of institutional involvement. Exhibit 1.1 clarifies what sub elements of the process are included in the best practices document.

[1] This document may be obtained on-line through the ITS Electronic Document Library (#13598), available through http://www.its.dot.gov.

Addressed in Document	Not Addressed in Document
Analysis of ITS Strategic Planning Experiences (12 Case Studies and 18 Survey Forms) ✍Review plans, documents, and studies ✍Record planners' opinions, perspectives, and viewpoints ✍Subjective evaluation ✍Factual data and information "highlights" ✍Level of effort each strategic plan required	ITS Strategic Plan Evaluation ✍Comprehensive factual data and information ✍Objective analysis ✍How well the strategic plan performed or met its objectives ✍How well the strategic planners interacted with one another and worked together ✍Quality of the strategic plan
1. Highlights of the Most Important Strategic Plan Facts and Milestones ✍Sufficient background information to establish the appropriate context ✍Sufficient background information to "set – the –record straight"	In-depth History of Each Strategic Plan
2. Strategic Plan Decision History ✍Why certain decisions were made ✍The issues involved ✍Planner recommendations of what they would do again	In-depth Analysis of Strategic Plan Decisions
Pointers and Guidance ✍Best practices ✍Pitfalls to avoid ✍Lessons learned ✍Unique characteristics ✍Variations on a theme	Guidelines ✍ITS project recommendations ✍Design guidelines ✍Equipment recommendations ✍Requirements development & selection ✍Functionality recommendations

Exhibit 1.1 - Best Practices Document Contents

BEST PRACTICES – TARGET AUDIENCE

This best practices document is designed to assist a broad range of users who have or who may have a stake in the planning and eventual deployment of ITS in rural regions or on a statewide basis. It is intended to engage traditional transportation stakeholders, including:

- ✍ Transportation Agencies (e.g., Federal, State, County, City)
- ✍ Local Government Agencies
- ✍ Public Transit Agencies
- ✍ Toll Authorities
- ✍ Regional Planning Agencies
- ✍ Regional Transportation Planning Agencies (RTPAs)
- ✍ Metropolitan Planning Organizations (MPOs)
- ✍ Councils of Governments (COGs)

In addition to these more traditional stakeholders, successful planning and deployment of ITS should also engage stakeholders not traditionally involved in the transportation planning process, including:

- Emergency Medical Community
- Public Safety and Law Enforcement Agencies
- Fire and Rescue Groups
- National Parks
- Business and Industry Groups
- Information Service Providers (ISPs)
- Communications Carriers
- Tourism Bureaus
- Weather Services
- Other Government Agencies and Departments

Their participation in the ITS planning process should not be overlooked due to the unique perspectives and opportunities that they can bring to the table.

2. METHODOLOGY

PROJECT APPROACH

The principal method for collecting data for this document was through telephone interviews with the project managers for each ITS strategic planning effort. Additionally, an in-depth review of relevant plans, studies, and deliverables was conducted.

The following activities were performed to develop the document:

- Identified candidate ITS strategic plans for analysis
- Prepared case study templates
- Prepared survey form templates
- Conducted document reviews
- Conducted telephone interviews
- Developed case study and survey form summaries
- Prepared lessons learned document

CASE STUDIES

In order to collect appropriate lessons learned, 12 in-depth Case Studies were conducted. The states and regions investigated were selected based on their completion status (preferably 100%), the ability to obtain in-depth information on the strategic plan, and broad geographic representation. The 12 areas selected for case studies are shown in Exhibit 2.1:

Case Study Location	Scope of Plan
Arizona	Statewide
Central Coast (California)	Regional 5 Counties
California-Oregon Advanced Transportation Study (COATS)	Regional 2 states and 8 counties
Colorado	Statewide
Kansas	Statewide
Minnesota Guidestar	Statewide
Montana	Statewide
Nebraska	Statewide
New Mexico	Statewide
New York	Statewide
Oregon	Statewide
VENTURE Washington	Statewide

Exhibit 2.1 – Case Study Location and Scope of Plan

Exhibit 2.2 shows the list of data or information collected for each case study. Appendix A contains the complete case studies, and Appendix C contains a matrix that summarized the results of both the case studies and survey forms.

Goals

- What were the plan's goals and objectives?
- What were the stakeholders trying to accomplish?

Approach

- What was the rationale behind the development of the plan?
- What was the organizational approach or decision-making structure used to develop the plan?
- What was the technical approach or scope-of-work undertaken to develop the plan?
- What agencies, firms, or interests were involved in developing the plan?

Contents

- What were the key ITS projects or activities identified in the plan?
- What architecture issues were addressed?
- What deliverables were part of the planning activity?
- What were the organizational issues faced in developing a plan?
- Did the plan include any outreach, marketing, or education activities in order to promote ITS awareness and acceptance?
- Did the plan identify any potential funding opportunities or sources that could be used to deploy identified ITS Projects?

Current Status

- What is the current status of the plan?
- What is the status of mainstreaming ITS Projects into the transportation planning process?
- Were operations and maintenance (O&M) considerations taken into account?

Future Activities Planned

- Have any additional activities been identified to advance the plan's utility?
- What is the deployment status of ITS projects identified in the plan?

Cost Information

- What was the public agency level of effort to develop the plan?
- What was the dollar value of the plan's consultant contract? (if applicable)

Benefits

- What were the benefits realized by the state and region by developing the plan?

Lessons Learned

- What lessons did the agencies or firms who developed the plan learn?

References & Contacts

- What plan documents were reviewed?
- Who is the primary agency contact for further information on the plan?
- Is there an Internet web-site address to obtain more information about the Plan?

Exhibit 2.2 – Information Collected for Each Case Study

SURVEY FORMS

To supplement the Case Study information for developing the planning guidance, 18 survey forms were prepared and delivered to sites based on geographic representation, the availability of information about the site's strategic plan, and the plan's completion status (preferably at least 50% complete). A lit of questions included in each survey form is shown on Exhibit 2.4. The 18 regions or states that completed survey forms are shown in Exhibit 2.2:

Survey Location	Scope of Plan
Alaska	Statewide
Arkansas	Statewide
Tahoe Gateway Counties (California)	Regional 4 Counties
Tahoe Basin (California & Nevada)	Regional 2 states 5 counties
Sierra Nevada (California)	Regional 9 Counties
Illinois	Statewide
Idaho	Statewide
Iowa	Statewide
Maryland	Statewide
Michigan	Statewide
Missouri	Statewide
I-80/US 395 Corridor (Nevada)	Regional Statelines (California to Utah)
South Dakota	Statewide
Tennessee	Statewide
Vermont	Statewide
Virginia	Statewide
Wisconsin DOT District 1	Regional 10 Counties
Wyoming	Statewide

Exhibit 2.3 – List of Regions or States That Were Surveyed

Contact Information

- Who are the primary agency contacts for further information on the plan?
- Is there an Internet web-site address to obtain more information about the Plan?

Participating Stakeholders

- What specific public agencies, private sector firms, or academic institutions were involved in developing the plan?

Plan Duration

- How long did it take to develop the plan?
- What were the project start and end dates?

Agency Level-of-Effort

- What was the public agency level-of-effort to develop the plan?

Consultant Support

- Was consultant support used to develop the plan?
- What was the dollar value of the consultant contract?

Plan Driving Force

- What was the rationale behind the development of the Plan?

Goals & Objectives

- What were the plan's goals and objectives?
- What were the stakeholders trying to accomplish?

Plan Highlights

- Were any elements or features of the plan emphasized?

Needs Determination

- How were the agency's needs, opportunities, and challenges determined?

ITS Architecture Considerations

- Was a regional ITS architecture developed?
- What were the architecture issues encountered?
- What architecture deliverables were developed?

Funding

- Did the plan identify any potential funding opportunities or sources that could be used to deploy identified ITS Projects?
- What is the status of implementing ITS Projects through these funding sources?

Operations and Maintenance (O&M) Considerations

- Have O&M considerations been taken into account?
- How were O&M concerns determined?

Costs & Benefits

- How were ITS costs calculated?
- How were benefits associated with ITS identified?

Exhibit 2.4 – List of Questions Included in Each Survey

Lessons Learned

- What were the benefits realized by the state and region by developing the plan?
- What were the lessons learned by the agencies and firms who developed the plan?

Current Status

- What is the current status of the plan?
- What is the status of "mainstreaming" any ITS projects into the transportation planning process?
- Have any additional activities been identified to advance the plan's utility?
- What is the status of deploying ITS projects identified in the plan?

Exhibit 2.4 – List of Questions Included in Each Survey (Continued)

PREPARE BEST PRACTICES DOCUMENT

The case studies and survey forms served as the primary sources of information for developing the best practices document. Additional information was obtained by reviewing each strategic plan, and then following-up with telephone interviews of the key plan developers. Case studies were developed based on reviewing the plans and interviewing and incorporating the completed survey forms. In order to ensure that contents were accurate, the completed case studies were sent back to the respective agency contact for review.

3. ITS STRATEGIC PLANNING PROCESS

INTRODUCTION

This section describes what an ITS strategic plan is and identifies some "typical" steps to follow to develop one. In addition, this section discusses the need for coordination of the ITS strategic planning process with the development of a regional ITS architecture.

WHAT IS AN ITS STRATEGIC PLAN?

The strategic plan is a road map on how to implement a system of technology-based strategies over a period of time. It provides a starting point for bringing ITS projects and systems together into an integrated plan.

An ITS strategic plan (or assessment) for a state, metropolitan area, region, or rural environment is a joint effort by involved agencies/stakeholders to develop a framework for ITS deployment in the region that makes the most of ITS opportunities to address regional transportation needs. This framework primarily addresses the institutional and operational elements needed for ITS to function as an effective, integral part of the statewide or regional transportation system. A strategic plan usually results in the identification of a set of ITS elements to be implemented over time. It is aimed at achieving specific transportation goals and addressing needs, and is coordinated with a variety of other planning activities, both locally and regionally.

It is expected that ITS systems and technologies will be increasingly incorporated into the transportation infrastructure over a period of time. Therefore, the strategic plan's importance grows as it becomes the framework to assure that all the pieces will ultimately fit together, not only with each other, but with other potential transportation improvements.

There are several important points to remember when considering whether or not to develop an ITS strategic plan

- There is no single "right" approach
- An ITS strategic plan may need to be updated over time as conditions change
- Strategic planning is most effective when undertaken as an integral part of the metropolitan or statewide transportation planning processes.

CHARACTERISTICS OF AN EFFECTIVE ITS PLANNING PROCESS

The development of an ITS strategic plan should follow a structured process to ensure proper coverage of relevant transportation issues, permit key input from transportation stakeholders within the region, and identify cost-effective and integrated solutions that can evolve as the state-of-the-art progresses. Exhibit 3.1 illustrates a typical process that has been used in previous efforts to develop ITS strategic plans in a number of metropolitan areas and states. In addition, most of the case studies in Appendix A also contain diagrams that depict the study process used to develop an ITS strategic plan. Please note that all of these approaches are depicted to serve as examples, not mandates.

As seen in Exhibit 3.1, the planning process moves from an identification of needs or objectives to the development of an implementation plan for inclusion in the regional transportation plan or Transportation Improvement Plan (TIP). Within the planning process, there are a number of steps (or tasks) to perform to ensure that a thorough, strategic assessment is conducted. Regardless of the exact steps taken, there are basically two main phases common within every planning process:

- ***Phase 1 - ITS Concept Definition.*** This phase examines the individual ITS elements that should be included in an area's regional framework for an integrated ITS. It includes visionary, top-down planning, as well as bottom-up identification of potential solutions that address specific problems.
- ***Phase 2 - ITS Framework Development and Implementation Plan.*** This phase identifies how the individual ITS elements fit and work together. It results in a set of implementable ITS projects and programs that are coordinated with non-ITS strategies, and suggests the institutional responsibilities for implementation.

Please note that there is no single right approach to develop an ITS strategic plan and that strategic assessment need not delay the implementation of important ITS projects for which funding is available. The steps and phases are not intended to be followed in rigid fashion, but rather to indicate a general approach or structure. Agencies should feel free to elaborate upon the steps presented so that the ITS strategic plan responds to local conditions and needs.

To gain more specific insights on the steps taken by other states and regions to develop their ITS strategic plans, please refer to each case study's "Approach" section (Appendix A). A broader interpretation of these steps is summarized for each Survey Form and can be found in Question #'s 7-14 (Appendix B).

WHAT IS A REGIONAL ITS ARCHITECTURE?

A regional ITS architecture guides the development of ITS projects and programs and is consistent with ITS strategies and projects contained in applicable transportation plans and ITS strategic plans. It fundamentally describes system elements, their relationship to one another, and how the ITS projects in the Strategic Plan will work together in a coordinated manner. The regional ITS architecture ensures institutional agreement and technical integration for the implementation of ITS projects or groups of projects. It is on a scale commensurate with the scope of ITS investment in the Region and includes the following at a minimum:

- Description of the region
- Identification of participating agencies and other stakeholders
- Identification of ITS projects and systems to be implemented
- An operational concept that identifies agency roles and responsibilities in the operation and implementation of the identified ITS projects and systems
- Agency agreements required for the operations and maintenance of the ITS projects identified
- System functional requirements
- Interface requirements and information exchanges with planned and existing systems
- Identification of ITS standards to be used for supporting Regional and National interoperability
- The sequence of ITS projects required for implementation

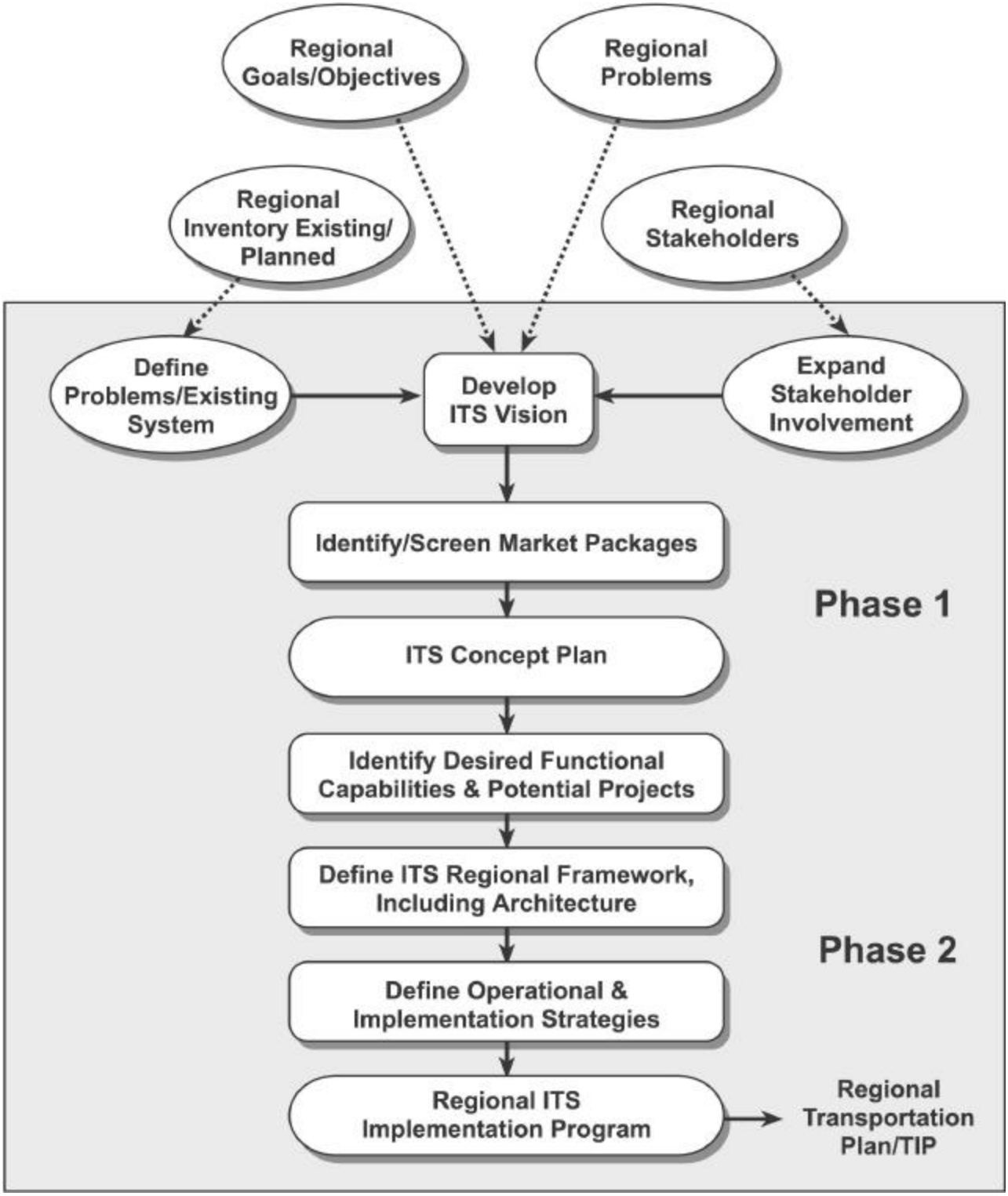

Exhibit 3.1 – Planning Process Frequently Used for ITS Strategic Plans

WHY DEVELOP A REGIONAL ITS ARCHITECTURE?

In April 2001, Part 940 of Title 23 of the Code of Federal Regulations became effective. This rule/policy was issued in order to implement Section 5206(e) of TEA-21, which requires that ITS projects funded by the Highway Trust Fund and the Mass Transit Account conform to the national ITS architecture, as well as to U.S. DOT adopted standards. Conformance with the national ITS architecture is interpreted to mean the use of the national ITS architecture in developing a regional ITS architecture, and the subsequent adherence of all ITS projects to that regional ITS architecture. Development of the regional ITS architecture should be consistent with the transportation planning process for statewide and metropolitan transportation planning and with any existing or planned ITS strategic planning efforts.

HOW TO DEVELOP A REGIONAL ITS ARCHITECTURE

The U.S. DOT has developed a "Regional ITS Architecture Guidance Document" (available as publication number FHWA-OP-02-024)[2] to assist stakeholders in developing, using, and maintaining an ITS architecture for their region. The agencies and other stakeholders participating in the development of the regional ITS architecture should develop and implement procedures and responsibilities for maintaining the regional ITS architecture as needs evolve in the Region. A regional ITS architecture is critical to the success of the regional ITS strategic plan because the architecture is the framework within which the system carries out the functions to support the system objectives.

For further information on how other ITS strategic plans led to regional ITS architectures, please refer to each case study's "Architecture Issues" section (Appendix A) and the summary of the survey question #10 (Appendix B).

[2] This document may be obtained on-line through the ITS Electronic Document Library (#13598), available through http://www.its.dot.gov

4. GOALS & OBJECTIVES

INTRODUCTION

This section presents reasons why a strategic planning process should be undertaken as well as the factors that contribute to its eventual development. In addition, this section discusses desired end-results of the strategic planning effort as well as national ITS goals that should be considered at the outset of an ITS strategic plan.

REASONS FOR CONDUCTING AN ITS STRATEGIC PLAN

There are several reasons why a state or region may find it advantageous to conduct an ITS strategic plan. These generally fall into one of the five categories described below:

Focus a Number of Disparate ITS Initiatives or Transportation Plans

One of the most compelling reasons to develop an ITS strategic plan is to combine or coordinate a number of individual ITS planning efforts within a region or state. This type of coordination promotes cost-efficiencies throughout the entire system life-cycle (e.g., planning, design, implementation, construction, O&M, management, etc.), added functionality realized through integrated and coordinated ITS systems, economies of scale through coordinated procurement, and improved agency cooperation.

Improve Coordination of Transportation Operations

An ITS strategic plan can also be the catalyst for promoting greater consideration of systems management and operations as a part of a state or region's overall approach to addressing their existing and anticipated transportation needs. The ITS strategic plan can often provide the mechanism for bringing stakeholders together to address transportation operations and management issues that may affect multiple agencies or organizations. Then, the ITS strategic plan can be used to "jump-start" ITS deployments for a broad cross-section of organizations in states or rural regions.

Meet the Regional Architecture Requirements of the DOT Policy

Another reason why a state or region may find it advantageous to develop an ITS strategic plan is to establish conformance with the National ITS Architecture. While the national ITS architecture is extremely useful for several reasons (as discussed in Section 3), primary among these are that it determines agency funding eligibility, promotes system integration for improved functionality, and assures consistent use of standards.[3]

[3] The DOT policy can be accessed through the Code of Federal Regulations online at http://www.access.gpo.gov/nara/cfr/waisidx_01/23cfr940_01.html

Prioritize or Select Specific Projects for Inclusion in State Transportation Plans

With the limited availability of funds, priority needs for specific ITS projects and programs can be defined within the framework of the region's overall transportation program in state or metropolitan transportation plans. However, these plans may not include the level of detail needed to ensure cost-effective implementation and coordinated ITS operations. In such cases, the ITS strategic plan represents the kind of specific ITS planning effort that will provide the requisite level of detail.

Support Special Events or Major Construction Projects

In some instances, on-going or planned construction activities (e.g., roadway widening, re-surfacing, etc.) or special events such as the Olympics have become the driving force to deploy ITS elements or conduct ITS strategic planning.

To gain more specific insights as to why particular ITS strategic plans were undertaken, please refer to each case study's "Approach" section (Appendix A) and each Survey Form's Question #6 (Appendix B).

WHY UPDATE AN EXISTING ITS STRATEGIC PLAN?

There are many reasons why a State or Region may find it advantageous to update an existing ITS strategic plan. These include:

- Original ITS strategic plan may not have considered all modes of transportation or geographic areas in the region
- Original ITS strategic assessment may have been more focused on a specific project than an overall regional plan or approach
- The national ITS architecture (and corresponding Turbo Architecture software), which may not have been readily available at the time of the original ITS strategic assessment, can be used to guide development of a structured regional framework for ITS implementation
- The institutional structure may have changed or new players may now be interested in ITS
- The diminishing costs of and new advances in ITS technology may have created new opportunities for ITS that were not previously available
- Transportation needs in the region may have changed, additional needs identified, or priorities re-evaluated
- Further need to strategize and articulate the ITS program's goals and objectives in support of upcoming ITS business plans or budget appropriations
- Original ITS system capabilities need to be expanded, modified, or enhanced
- Geographic expansion of an ITS system may be needed (e.g., deployment of roadway surveillance systems on additional roadways to increase coverage density).

5. STAKEHOLDER PARTICIPATION

INTRODUCTION

This section presents the outreach efforts used to identify and involve all traditional and non-traditional stakeholders in the ITS strategic planning effort. In addition, representative organizational structures are discussed, decision-making processes presented, and consensus building approaches identified.

ORGANIZATION, COORDINATION, AND MANAGEMENT

Defining an Organizational Structure

One of the most important aspects of conducting ITS strategic planning is to organize the stakeholders so that everyone knows their roles, responsibilities, and what's expected from their agency's participation. An ITS strategic plan can be initiated by any agency involved in transportation or implementation; the effort does not always have to be led by a state DOT (although most efforts have been in the past). Regardless of who is the lead agency, interested stakeholders should be actively engaged in a process of education and training related to the implementation of ITS, highlighting potential system functions and benefits. Each stakeholder can then become more actively involved in the planning, design, and implementation of the strategic plan. Then, stakeholders become more informed decision makers of ITS and better understand what ITS can do for them and their region.

At this early stage of the ITS Program, it is important to develop a decision-making structure and agency review and approval process to proactively manage the strategic planning effort. The primary decision-making authority (or oversight group) is commonly referred to as the steering committee. In addition, sub-committees or advisory councils that address specific functional areas such as transit, Commercial Vehicle Operations (CVO), architecture, traffic management, technology, funding) or that represent particular geographic interests should also be established.

It is important to involve regional FHWA and/or FTA staff because of their experience in mainstreaming the ITS strategic planning process across the country, their knowledge of the region, and their role in determining conformance with the regional ITS architecture. FHWA and/or FTA participation as an actual member of the Steering Committee is recommended.

Consensus Building and Sustainment

Just embarking on an ITS strategic planning effort is quite an accomplishment, but even more important is an agency's sustained participation in the regional ITS program. One way to establish this coordinated involvement is to get all of the stakeholders to agree up-front that they will all focus on the needs of the state or region versus the desires of their individual agency or department. Then, stakeholders should all explore interagency cooperation and cross-boundary operational needs, identify critical areas of operation and potential conflict, and define the roles and relationships between and within agencies, especially for on-going O&M of the regional ITS program. In addition, they should review contracts, legislation, and regulations as they relate to

ITS in order to identify legal and policy barriers to deployment and develop implementation and operational guidance tools so that Agencies/staff know what is expected of them.

SUCCESSFUL TACTICS FOR GENERATING STAKEHOLDER PARTICIPATION

Participation

Methods to obtain and maintain stakeholder interest and commitment in the ITS strategic plan can be a challenging undertaking. Successful ITS deployment requires not only effective technology, but also the often elusive and challenging institutional, policy, and financial foundations critical to implementing that technology. Therefore, it is important to identify, develop, and cultivate relationships among a wide range of stakeholders since the regional and statewide planning process requires participation from many state and local agencies. Stakeholders should include the following at a minimum:

- Agency support staff (e.g., telecommunications, information technology, contracts, etc.)
- Metropolitan and regional planning agencies
- Other non-traditional groups (e.g., tourism boards, National Park Service, emergency responders, etc.)
- Private sector interests (e.g., casinos, communications firms, ski resorts, etc.).

Participation should also include relatively high-level management of each involved agency so that broader program impacts to the agency will be fully understood and to facilitate internal support throughout the organization. In addition, it is critical to have at least one representative from each agency represented on the steering committee attend every stakeholder meeting. Participation of a diverse mix of stakeholders is critical to getting a well-rounded assessment of regional needs and showing that agencies are committed to addressing those issues and promoting the ITS program.

Maintain Participation

Managing agency and stakeholder priorities and expectations is critical to the success of the ITS strategic planning effort. In addition, the ITS strategic plan should craft the agreements and partnerships that will sustain ITS implementation. Maintaining stakeholder participation beyond the conclusion of the ITS strategic planning can be better assured through continued meetings of the steering committees and by joint participation of agencies and organizations in the resulting deployment activities. This works best when the "right" people, that is the people who need successful deployment of ITS, serve on the steering committee and work groups. Broad, regional buy-in to ITS initiatives can be assured by establishing regional teams on a geographic basis. Rotating steering committee meeting locations throughout the study area can also be beneficial in ensuring that the project is not focused on just part of the region and is also not perceived as such.

Stakeholder Interest

The planning will be more successful when stakeholders understand what ITS is and what it can do for them. This can be accomplished by providing short seminars regarding ITS applications. Planning is also more successful when stakeholders focus their efforts on those areas such as

articulating transportation needs and defining ITS projects, rather than focusing on architecture development or the planning process, which many be better addressed by others. Stakeholder interest is also stronger (and thus, the planning effort more successful) when potential ITS projects are identified early in the planning process. "Early Winners" maintain agency and other stakeholders' interest and provide a stronger vision of potential accomplishment.

ITS Champions

Lessons learned on similar ITS Strategic planning efforts throughout the country have shown that the single most important factor in the successful implementation of ITS projects in rural areas is identifying ITS project "champions". Finding, developing, and maintaining ITS champions in each agency can make them even more committed to the success of the Regional ITS Program since their staff is actually leading the planning, design, and/or implementation efforts.

Public-Private Relationships

Private sector participation (e.g., casinos, ski resorts, lodging associations, chambers of commerce, etc.) in the ITS planning process is important for a number of reasons. Private sector businesses such as resorts, for example, have a solid understanding of traveler characteristics and travel patterns that would facilitate development of ITS applications.

This participation can be encouraged by demonstrating that potential ITS solutions promote economic vitality that supports the private sector. Stakeholder commitment can also be maintained by interacting with private and public sector stakeholder groups by attending their meetings to discuss ITS and obtain their input and feedback. It is important to recognize the learning curve that might be associated with non-traditional contractual arrangements (such as a public-private partnership) and to learn to work with private sector interests as partners rather than as clients.

New Roles & Responsibilities

Since ITS applications can directly affect agency operations and staffing needs, the ability to support these operations is a key consideration of ITS feasibility and acceptability. Therefore, agencies will need to assess their current staffing capabilities and determine if additional staffing or training is required to support the regional ITS program. One new responsibility, for example, is that Metropolitan Planning Organizations or Regional Transportation Planning Agencies often become responsible for updating the Regional ITS Architecture and for ensuring conformance when additional ITS projects are implemented.

State DOT Role

It is important that all organizations within the state DOT (e.g., regions, operations, maintenance, etc.) are involved in the rural ITS planning process to ensure that support at all levels is obtained for ITS. This support can best be garnered through inclusion of relevant state DOT organizations in the process at the earliest point possible. One state DOT reports it learned that it may not always be the lead agency in designing and deploying ITS projects while another noted the need for an ITS coordinator in each of their regions to serve as a resource within the region and a point-of-contact to other stakeholders.

To gain more specific insights on organizational structure and consensus building approaches found in other ITS Strategic Plans, please refer to each case study's "Approach" and "Organizational Issues" sections (Appendix A).

6. OUTREACH, EDUCATION, & MARKETING ACTIVITIES

INTRODUCTION

Section 6 presents various educational, marketing, and outreach activities that can be used to inform stakeholders of the concepts of what ITS is and how ITS can help. In addition, tools that can be used to keep stakeholders up-to-date about ITS and ideas that can help sell the strategic plan to stakeholders ranging from elected officials to community residents are also discussed.

BEST PRACTICES

Educational Workshops

To better manage agency and stakeholder expectations of ITS, the ITS strategic planning process should include a half-day educational workshop that describes ITS, the functionality ITS applications can provide, and potential benefits and costs of ITS. In addition, half-day workshops that describe the national ITS architecture, its components, and the regional ITS architecture development process, conducted in a step-by-step graphical manner and in layman's terms, can provide knowledge to stakeholders to allow them to more effectively participate in the planning process.

Outreach Materials

The ITS strategic planning process should also develop outreach materials based on an accurate gauge of stakeholder understanding of ITS so that the right stakeholders are provided the right information at the right time. The region should make full use of the FHWA's ITS resources (e.g., the PCB program, the regional ITS architecture guidance document, the Rural ITS Toolbox, etc.). In addition, the region could create ITS newsletters, fact sheets, brochures, videos, and other materials to keep stakeholders informed and up-to-date on project activities. Another useful tool for outreach is a site-specific, frequently updated, and content-rich web site that provides relevant information regarding the project.

Obtain Regional Input

Input from stakeholders across the region is needed to ensure that:

- ?? Planners obtain a complete understanding of issues affecting ITS project selection.
- ?? Planners obtain buy-in from as many stakeholders as possible.

Conduct interviews or workshops with key stakeholders to allow them the opportunity to express their opinions and viewpoints on the ITS strategic planning effort. These meetings are most effective if they take place across the region for fullest participation. Contacting potential attendees in advance of the workshop ensures that the most appropriate people can attend. Meaningful materials (e.g., an agenda, a set of questions that will be addressed at the meeting, an ITS newsletter, fact sheets, etc.) should also be distributed in advance so that stakeholders are better prepared for valuable participation. Using survey forms to solicit input can be useful for collecting input from stakeholders who cannot attend.

At these meetings, encourage open discussion and brainstorming so that all stakeholders have the opportunity to present their ideas and opinions. It is useful to have a knowledgeable facilitator lead the meeting to ensure that the meeting is interactive and progresses at an appropriate pace, that all stakeholders may participate and no one dominates, and that the meeting remains focused. It is useful to visibly record key discussion items on flip charts or white boards and have a scribe type notes directly into a computer.

Learning About ITS

The ITS strategic planning process should include scanning tours, or visits, to other ITS deployment sites to gain first-hand insight on system functionality, O&M concerns, funding mechanisms, etc. In some instances, the FHWA or the FTA can provide funding for these tours. In addition, there are a number of ITS conferences (e.g., the Rural Advanced Technology and Transportation Systems Conference, ITS America's annual meeting, Regional ITS Chapter meetings, the ITS World Congress, ITE annual meetings, and local ITE district meetings) that are useful for exchanging information and learning of the latest developments in the ITS industry. At a regional level, Stakeholders should strive to get ITS listed as a regularly scheduled agenda item at local Board/Commission meetings.

To gain more specific insights on the educational, marketing, and outreach activities and materials in other ITS strategic plans, please refer to each case study's "Outreach, Marketing, and Education Activities" section (Appendix A).

7. FUNDING OPPORTUNITIES & SOURCES

INTRODUCTION

Implementation of an ITS program for a state or region will require adequate funding to achieve the desired goals of most stakeholders. Funding is required to implement the system as well as to operate and maintain the system over time, and to upgrade the system as technology capabilities and system needs evolve. In this section, "mainstreaming" ITS into the traditional transportation planning process is presented, funding opportunities and sources are discussed, and the potential for private sector financing is investigated.

MAINSTREAMING ITS

ITS can be viewed as an integrated element of other transportation programs, and thus, ITS funding can be approached as a part of the funding of an entire package of improvements. For example, ITS projects or elements could be incorporated as part of major construction, operations, or maintenance activities (e.g., capacity expansion, new roadway construction, lane widening, re-surfacing, HOV lane addition, or re-construction). For example it is logical to deploy variable messages in conjunction with adding HOV lanes; to deploy camera systems as part of new highway construction; or to implement a GPS tracking system when upgrading maintenance or transit vehicles. In these cases, ITS funding might be a relatively small part of the total funding package.

Alternatively, ITS can be treated as a separate set of implementations with separate funding. In this case, ITS is often viewed to be in competition for funding against other projects, and obtaining funding tends to become part of an advocacy process. **It is not the intent of this lessons learned document to advocate either approach, since either can be effective and successful.** The intent of this document is to provide information that will assist agencies to explore and pursue funds for ITS either as an integrated part of other funding or as stand-alone funding for individual ITS projects.

For further information on the extent to which ITS strategic plans mainstreamed their ITS Projects to be included as part of the traditional transportation planning process, please refer to each case study's "Funding Opportunities and Sources" and "Mainstreaming ITS" sections (Appendix A) and survey results for questions 11 and 12 (Appendix B).

POTENTIAL FEDERAL FUNDING SOURCES

The following funding sources from the federal government are available to assist with the funding of ITS Programs:

- National Highway System (NHS) funds
- Surface Transportation Program (STP) funds
- Congestion Mitigation and Air Quality (CMAQ) funds
- Federal Transit Funds
- Interstate maintenance funds
- Interstate discretionary funds

- U.S. DOT safety initiatives (e.g., 511 and Mayday)
- U.S. DOT Research and Special Programs Administration (RSPA) University Transportation Centers program
- Federal Emergency Management Agency (FEMA) funds
- Highway Bridge Replacement and Rehabilitation Program funds
- Scenic Byways Program funds

For specific information on how other ITS Strategic Plans identified funding opportunities and sources, please refer to each case study's "Funding Opportunities and Sources" section (Appendix A) and survey questions 11 and 12 (Appendix B).

PRIVATE FUNDING POTENTIAL

A relatively new and growing funding source is based on public/private partnerships. This is the situation in which the private entity provides ITS services and/or system elements, but instead of direct reimbursement from a public agency, some or all of the private entity's costs are recouped by selling ITS-based services to other private entities including end users. For example the private entity could collect a user fee each time a customer receives a service such as a customized road report by email, or special consideration at toll booths. Or, the private entity could charge for advertisements included as part of the phone message when a user makes a phone call for a specialized weather report. A public/private partnership offers the possible advantage of public cost reduction, and it offers the public agency the opportunity to capitalize on the private sector's market orientation, which could be helpful in initially "selling" the ITS service to the public.

Typical Areas for Public/Private Partnerships

- Private agency marketing and sales of in-vehicle and portable devices to provide real-time traveler information and routing
- A government agency provides access to highway right-of-way (ROW) to a private firm, which in return install and maintains a communications network (such as a fiber line) that the government agency uses for reduced cost. The private communication firm recoups the cost of deploying the communication system by using it to provide communications services to other users (e.g., other private entities) and charging for this service.[4]
- Private entity collection, marketing, and sale of real-time traveler information supported by advertising (e.g., the Weather channel).

[4] Refer to http://www.its.dot.gov/tcomm/tcomm.htm for more information on ITS telecommunications resource sharing

Basic Principles in Developing Public/Private Partnerships

- Assist the private sector in areas of ITS that are profitable business ventures
- Be willing to take calculated risks but address these in the structure of the arrangements made for a particular ITS Project
- Be willing to alter the traditional role or make legislative changes related to procedures for interaction of state, MPO, Rural Transportation Planning Authority (RTPA), and local governments
- Provide an atmosphere of stability and establish long-term commitments to engender the confidence of the private partners
- Devise balanced mechanisms (e.g., legal agreements and cost-/profit-sharing arrangements) that protect both parties but do not squelch the opportunity
- Be willing to give up responsibilities where there are opportunities for privatization.
- Leave room for competition

For further information on how other ITS Strategic Plans identified funding opportunities and sources, please refer to each case study's "Funding Opportunities and sources" section (Appendix A) and survey questions 11 and 12 (Appendix B).

8. OPERATIONS, MAINTENANCE, & MANAGEMENT CONSIDERATIONS

INTRODUCTION

Successful ITS implementations include more than initial hardware and software installation. There is also on-going operations and maintenance (O&M), including costs and responsibilities. O&M requires an adequate staff of available and well-trained system operators and maintenance personnel, up-to-date documentation on all system components, an adequate budget for spare parts and expendables, and a long-term commitment on the part of the transportation agencies to utilize the system to its full potential. It should be noted that the size and low population density in many rural regions might make many ITS solutions a challenge to operate and maintain.

In this section we discuss a number of O&M issues that need to be addressed in the ITS planning process and how they are typically addressed. Areas of emphasis include examining when and how O&M issues are considered in the planning process, how agency and staff O&M capabilities feed into ITS decisions, and O&M costs.

EARLY CONSIDERATION OF O&M

The operation and maintenance of an ITS system must be considered in the planning and implementation process. Most strategic planning activities do not go far enough in addressing ITS O&M. Examining the strategies for operation of a system in detail will ensure that there are not gaps in the O&M plan and will help to ensure there are not overlapping, unnecessary, or unproductive O&M activities. This planning will help in reducing costs and will help to protect the initial investment.

It is recommended that O&M staff participate in the planning process so that the ITS Strategic plan can continue to obtain O&M input throughout the planning process in order to continually assess agency roles and activities. An O&M section is an important section of an ITS strategic plan. This section would detail which agencies will be responsible for specific areas of ITS implementation, operations, and maintenance.

AGENCY CAPABILITIES AND RELATED COSTS

Providing qualified personnel and staff with available equipment to operate and maintain the ITS system is essential. Within each region, the O&M requirements for the planned systems must match the availability of proper personnel, equipment, and budget resources for O&M. The Region could out-source O&M contracts to other agencies or private sector firms as an alternative to providing its own staff.

If the region performs its own O&M it should have training programs for staff on operations, maintenance, and management issues to ensure that the necessary skills are available and that continued professional capacity development is made available because of the changing nature of ITS technologies.

O&M RESPONSIBILITIES

Stakeholders should plan and identify which departments within their organizations will be responsible for operation and maintenance of ITS systems and components within the covered region. These departments should be notified of and trained for their future responsibilities so that funding and personnel needs can be properly budgeted.

O&M COSTS

Stakeholders should discuss O&M issues and costs with other agencies who have deployed similar systems, and with personnel within their own organizations who currently maintain similar components. It may be found for example, that replacing components (for example, LEDs) on a pre-determined schedule is cheaper and/or more efficient than replacing them as they break.

OTHER COSTS

Especially for operations, stakeholders should consider what supporting staff, hardware and software is needed to run the planned systems. For example, it may be found that multiple systems can be more efficiently operated from a central location by a dedicated staff. It is also very important to plan and budget for proper system integration, both within a system's various components, and between multiple systems. Communications issues can be a problem and should be given consideration early in the strategic planning period.

Stakeholders should also consider and identify any special tools/equipment and training necessary to properly operate, maintain and repair their planned deployments.

The high-level structure (components covered and length of coverage period) of system and component warranties should also be considered during strategic planning.

9. COSTS

INTRODUCTION

This section presents representative costs of undertaking an ITS strategic planning effort. These costs come from two areas: the costs of the public sector's efforts and the costs for contracting with the private sector. This section discusses both. In addition, this section discusses representative costs associated with each step of an ITS strategic planning effort (as outlined in Section 3). Note that all costs are representative values, based on an amalgamation of what other agencies have found, and do not indicate the actual costs that your agency or region may incur. Too much variance between regions (e.g., the type and number of stakeholders involved, the level of detail desired for the effort, the type and number of deliverables, the size of geographic region covered, and the extent of outreach required) precludes direct correlation.

This section does not present cost information on the design, development, procurement, installation, or O&M for individual ITS projects that may be identified during the planning effort. The reader is asked to contact agencies who have deployed similar ITS applications for this cost information.

STRATEGIC PLAN COST/LEVEL-OF-EFFORT

Exhibit 9.1 summarizes the costs and levels of effort incurred to complete the ITS strategic planning effort for each region for which we analyzed a case study or survey form. Information is provided for both the public sector level of effort and the private sector contract value.

For more detailed information refer to the "Cost" section of each case study (Appendix A) and questions 4 and 5 of each survey form (Appendix B).

Strategic Plan	Public Sector Cost (staff hrs/mo.)	Price for Private Sector ($)	Comments
Arizona	N/A	N/A	
Central Coast (CA)	20	$370,000	
COATS (CA and OR) Caltrans staff Oregon DOT staff Coordinating group	 100-120 80 15	$314,200	As lead agency, Caltrans has higher time commitment Private sector costs derived from "Project Task" table (Appendix A)
Colorado	N/A	N/A	
Kansas	60-64	$447,882	Private sector cost included 2 year evaluation period

Strategic Plan	Public Sector Cost (staff hrs/mo.)	Price for Private Sector ($)	Comments
Minnesota Guidestar			Additional public sector staff attendance at workshops
Strategic Plan (1992)			
Rural Scoping Study (1994)	30	$300,000	
NOVA Strategic Plan (1997)	$37,000	$100,000	
	60	$150,000	
Montana		$200,000	
MDT staff	100-120		
Steering committee	8		
Nebraska			Statewide ITS plan leveraged efforts and followed Omaha EDP methodology
Omaha EDP (1995)		$450,00	
Statewide ITS Plan	100-120	$60,000	
New Mexico		$130,000	
NMSHTD staff	100-120		
Steering committee	10		
New York	N/A	$405,000	
Oregon	30	$150,000	DOT PM at 20 hrs/mo. Support staff 10 hrs/mo.
Washington			
Statewide ITS Plan (1993)	80	$500,000	
I-5/I-90 Corridor Study (1997)	80	$500,000	
Alaska	80	$270,000	
Arkansas	N/A	$185,000	
Tahoe Gateway Counties (CA)	20	$315,000	
Tahoe Basin (CA and NV)	24	$330,000	
Sierra Nevada (CA)	80	$500,000	Public sector costs reflect different staff with varying levels of effort over time
Illinois	N/A	N/A	
Idaho	$90,000	$330,000	
Iowa	N/A	$300,000	
Maryland CHART	16	$70,000	
Michigan	N/A	$90,000	

Strategic Plan	Public Sector Cost (staff hrs/mo.)	Price for Private Sector ($)	Comments
Missouri	N/A	N/A	
Nevada I-80/US 395 Corridor	20-30	$250,000	
South Dakota	80	$115,000	
Tennessee	50	$100,000	Public sector costs include ITS Coordinating Committee meetings and preparation twice a month.
Vermont	25	$30,000	
Virginia Smart Travel	N/A	N/A	
Wisconsin	120	$850,000	Private sector costs include preliminary engineering for high priority ITS projects
Wyoming	N/A	$275,000	

Exhibit 9.1 - Level of Effort and Price for Strategic Planning

PUBLIC SECTOR LEVEL OF EFFORT

The level of effort data presented in Exhibit 9.1 shows that development of an ITS strategic plan can in some cases require a substantial commitment of staff resources. In addition, case studies indicate that commitment of additional staff resources will not necessarily reduce private sector costs. For example, the median and average price for private sector efforts using 64 (the average) or fewer staff hours per month were $250,000 and $229,000, respectively. Corresponding prices for private sector efforts involving more than the average number of public sector staff hours were $500,000 and $403,000. This appears somewhat counter-intuitive. Clearly, the relationship between public sector staff hours and private sector costs is driven by the overall scope and project complexity which are not considered in the above comparison. It is simply worth noting that close attention should be paid to the scope and complexity of the planning efforts described in the case studies because there is no simple relationship between the number of public sector staff hours and the amount of private sector funding.

As can be seen in Exhibit 9.2, the average amount of time that a public agency spent per month to participate in the ITS strategic planning effort is 64 hours. This value most likely represents the staff commitment for only the Lead agency since the lead agencies provided the cost information. This means that agencies leading an ITS strategic planning effort should commit at least 40% of one staff member's time (or the equivalent from multiple staff) for the effort.

Ranking	Staff-Hours per Month	% of Time per Month
High	120	75%
Average	64	40%
Low	16	10%

Exhibit 9.2 - Public Sector Cost Level – of Effort

Other agency participants or stakeholders would probably need to commit at least 10 to 12 hours per month, which is derived from the average steering committee's level –of effort noted in Exhibit 9.1.

Please note that the hours incurred by public agency staff can be affected by a number of factors including, other staff members' level of involvement, the level of private sector support, personal motivation and interest, workload on other activities, project duration, the number and depth of deliverable reviews, and extent of the project study area.

For further information on the level of effort expended by public agencies to develop ITS strategic plans, refer to the "Cost" section of each Case Study (Appendix A) and question # 4 of each survey form (Appendix B).

PRIVATE SECTOR PRICES

The price of private sector work (that is, the value of the planning support contract) for each ITS strategic planning effort studied is shown in Exhibit 9.1. Exhibit 9.3 shows the high, average, and low prices.

Ranking	Contract Value ($$)
High	$850,000
Average	$350,000
Low	$30,000

Exhibit 9.3 - Private Sector Contract Value

The average private sector contract value of $350,000 includes the performance of all of the ITS strategic plan "steps" identified in Section 3 because these steps were part of the strategic planning efforts with contract costs close to the average.

Exhibit 9.4 presents representative low, average, and high cost estimates to complete an ITS strategic planning effort in another way. Cost estimates are shown for each of the strategic assessment steps identified in Section 3.

Planning Process Step (from Exhibit 3.1)	Low Cost	Average Cost	High Cost
Regional Stakeholder Involvement -- Outreach, Education, & Consensus Building	$15,000	$30,000	$45,000
Regional Inventory -- Existing & Planned	$15,000	$25,000	$30,000
Define Problems & Existing System Issues	$15,000	$25,000	$30,000
Develop ITS Vision	$5,000	$10,000	$15,000
Identify/Screen Market Packages & ITS Concept Plan	$30,000	$50,000	$70,000
Identify Desired Functional Capabilities & Potential Projects	$20,000	$40,000	$60,000
Define ITS Regional Framework (Including Architecture)	$25,000	$50,000	$75,000
Define Operational & Implementation Strategies	$30,000	$50,000	$75,000
Regional ITS Implementation Program	$10,000	$20,000	$30,000
Project Administration/Management (Approx.10-15% of Total)	$25,000	$50,000	$70,000
TOTAL	**$190,000**	**$350,000**	**$500,000**

Exhibit 9.4 - Cost Estimates to Complete ITS Strategic Planning Effort

Exhibit 9.4 shows that public agencies pay at least $190,000 for private sector support for ITS strategic planning. As seen from Exhibit 9.4, the "typical" ITS strategic assessment would cost approx. $350,000 with the high-end budget around $500,000.

Please note that the actual contract value amount public agencies need to budget may vary from the above results because of a number of factors such as the extent of the project study area, the level of transportation planning traditionally performed in the region, the status of the system inventory, knowledge of needs and problems, institutional hurdles such as the ability to develop MOUs, the anticipated level of outreach activities, the type and number of materials to be produced, the type and number of interviews and workshops to be conducted, the variable nature of the processes used to develop an ITS vision and a market package plan, the existence or extent of a regional ITS architecture, the extent of technology review required, project duration, and the number and depth of deliverable reviews.

For further information on the value of consultant support contracts refer to "Cost" section of each case study (Appendix A) and question #5 of each survey form (Appendix B).

PLANNING LEVEL COST ESTIMATES

Planning level cost estimates are needed to develop and prioritize individual projects to develop the broader ITS program. The Cost Analysis document found on the National ITS Architecture CD-ROM provides a wealth of cost information that can be used for ITS strategic planning, corridor or area studies, or other planning activities. Some of the principles identified through the case studies and surveys should be considered in developing planning level cost estimates include:

- Do not be overly conservative or liberal on cost estimates; however, one should probably err on the high side so as to retain credibility of the program by minimizing cost overruns
- Work on an installed unit cost basis (e.g., per intersection, per mile, per ramp, per bus, per control center, etc.), but also take into account major features
- Estimate full life-cycle costs, including design, development (especially software), procurement, installation, integration, acceptance testing, evaluation, O&M, management, and spare parts inventory
- Document assumptions so that adjustments in the costs can be more easily made if costs or quantities change
- Distinguish any systems or components that will be funded from other sources, so that this can be accounted for properly (and identified in the appropriate other plan such as the Transportation Improvement Plan (TIP))
- Use cost data from your own sources and experiences when possible
- Assess potential costs by analyzing the results and costs of similar projects successfully deployed in other regions
- Incorporate ITS programs into new transportation projects to facilitate funding, construction coordination, and lessen the perceived cost of ITS (which is typically a small portion of other projects such as highway construction or rehabilitation)
- Commit sufficient funds and staff resources to adequately conduct strategic planning
- Make use of the helpful cost information provided in the case studies
- Software development costs should not be underestimated since they are often higher than planned
- Communication costs are large compared to equipment costs and should be carefully scrutinized

10. POTENTIAL BENEFITS

INTRODUCTION

In this section, selected potential benefits associated with ITS strategic planning are presented. These are primarily in the form of qualitative measures and perspectives (e.g., institutional and procedural) with quantitative measures and efficiencies (e.g., financial and operational) provided to the extent possible.

HOW BENEFITS WERE DETERMINED

This section discusses how benefits listed in this section were assessed. The methodology used by the study team consisted of examining lessons learned and the experiences of various regions where ITS strategic plans were prepared, assessing regional goals and objectives, and examining technology selection in the region. Issues addressed in determining benefits are summarized below.

Look at What Other Regions Have Done

- Assessed based upon area needs that would be addressed by the ITS Projects
- Assessed by looking at successes in other areas
- Consideration of benefits has been very qualitative through providing example benefits from ITS deployments in other States
- Some quantifiable ITS benefits were based upon the FHWA's "ITS Benefits Update (September, 1999)"
- Benefits were estimated based on findings from recent Model Deployment Initiatives (MDIs), field operational tests, and established projects

Base on Goals/Objectives & Performance Criteria

- All ITS goals have specific measurable objectives that can be evaluated and assessed for their corresponding benefit
- The benefits were measured using an evaluation methodology based on various weighted performance criteria (e.g., crashes, LOS, trip predictability, etc.)
- ITS Projects should be evaluated as deployed in order to assess to what extent they are meeting user needs and performance criteria (quantitative and qualitative)

Technology Selection Criteria

- During the selection of near-term projects, benefits of each technology were presented in terms of the extent to which each technology:
  - Addressed the needs along the corridor
  - Met the goals and objectives of the study
  - Ready for deployment
  - Projects that ranked high in this evaluation methodology will likely be the first projects deployed
- Actual benefits may depend on a number of factors such as congestion levels and the extent of ITS system coverage

For further information on the potential benefits found in other ITS Strategic Plans, please refer to each Case Study's "Benefits" section (Appendix A) and each Survey Form's Question #'s 14 and 15 (Appendix B).

BENEFITS OF CONDUCTING AN ITS STRATEGIC PLANNING EFFORT

This section describes potential benefits that can be derived from ITS strategic planning. These benefits generally fall into the following categories:

- ?? Development of deliverables that could be used in preparing ITS projects
- ?? Improved coordination among agencies
- ?? Stakeholder involvement and education

Development of Necessary ITS Deliverables

A major benefit of ITS strategic planning is the preparation of plans and analyses that can be used to support development of ITS applications. The main benefit of the Statewide ITS planning process was a “doable” plan; that is, a plan that provided stakeholders with guidance for proceeding with a Statewide ITS program. Other benefits in this category include, but are not limited to, the following:

- ✍ Specific deliverables developed:
- ✍ ITS concept-of-operations
- ✍ Identification of recommended ITS Projects for implementation
- ✍ ITS deployment schedule
- ✍ ITS procurement strategy
- ✍ Long-term outreach strategy
- ✍ Regional ITS Architecture (and associated deliverables)

Coordination Among Agencies

Improved coordination among agencies is a major benefit of the ITS strategic planning process. A solid ITS strategic planning process brings together many agencies that heretofore may have attempted limited, if any, coordination. The process typically improves understanding of the challenges confronting other organizations and serves to identify opportunities for common approaches. The result is frequently a strengthening of close-working relationships between ITS stakeholders across jurisdictional boundaries as evidenced by the creation of ITS Coordinating Groups that continue to meet after the strategic assessment has been completed. Other benefits include:

- Agency/County support for the ITS Strategic Plan
- Receipt of "achievement awards" promotes stakeholder participation, team mentality, and solidarity
- Inter-agency cooperation among regional stakeholders promoted through Steering Committee meetings and other outreach efforts
- Encouraging different agencies to participate in discussion and decision-making regarding ITS has led to each Agency having a much better understanding of the other agency's perspectives, goals and capabilities
- Provides an overall statewide framework to help District-level initiatives work better together

Stakeholder Involvement & Education

One of the main benefits in this area is improving stakeholders' understanding of ITS and eventual commitment to ITS as an alternative approach to addressing transportation issues. Benefits include:

- Introducing the private sector to the strategic planning process has introduced new perspectives, ideas and opportunities, and it has also broadened the "buy-in" to the resulting plan
- The process of completing the strategic plan had benefits in terms of creating ITS awareness among State agencies and formulating partnerships for future deployments
- Increases awareness of ITS throughout the State

Other benefits to preparing an ITS strategic plan may include increased public/private partnerships, organizational changes at transportation agencies, and improved mainstreaming of ITS into the traditional planning process. While the use of public-private partnerships has brought many challenges, it has also brought many benefits including the opportunity to leverage different sources of funds, increased "buy-in", broadened understanding of how each sector operates and of the constraints within which each has to carry out its work. State DOTs have examined their organizational structures and, in at least one case, have established a dedicated branch/group to work specifically in the area of ITS and to focus on the needs of ITS deployment in the state.

11. GUIDANCE HIGHLIGHTS FROM CASE STUDIES

INTRODUCTION

In this concluding section, a series of guidance "highlights" derived from case studies are presented. While some lessons learned may appear to be obvious to the more experienced reader, this section will nevertheless serve as a valuable review tool prior to starting a new project. For easy reference, guidance highlights are organized by the "typical" steps found in the FHWA ITS Strategic Planning Process illustrated in Exhibit 3.1

STRATEGIC PLANNING -- OVERVIEW

Implementation

The ITS Strategic assessment should ensure that adequate resources are dedicated to implementation. Specific projects for implementation should be identified and targeted deployment schedules established.

Strategic Plan Updates

Since ITS technology and practices are evolving so quickly and given the novelty of ITS to many Stakeholders, and since regional circumstances are continuously evolving frequent ITS strategic planning is as important as having a written plan. Therefore, updating planes annually is a useful undertaking. Regional Stakeholders should monitor continuing ITS project deployments in the region, and then maintain and update the project database in order to evaluate the expected benefits.

Projects vs. Process

Balancing the ITS planning process with the selection of recommended ITS projects is the key to maintaining stakeholder interest while satisfying federal and state guidelines. Most non transportation agencies do not get involved in ITS until real, funded projects are begun. Usually these other agencies will only be willing to contribute resources or initiate new projects when they begin to comprehend benefits to them. Care should be taken, however, to ensure that the Region-/Statewide Strategic Plan is not just a "cookie cutter" study; each strategic assessment requires targeted, creative application of ITS.

Communication & Coordination

Communication between stakeholders and coordination of ITS initiatives is important to long-term success of an ITS program. Coordinated planning helps ensure that ITS deployments are integrated into the state's broader architecture. Coordinated, concurrent deployments and parallel efforts among different regions are helpful to ensure that systems work together and to avoid redundant or superfluous efforts.

In addition, close communication between the state DOT and district-level staff at the outset of the planning effort can very useful. If there is coordination, then early winners or early successful implementations by a district become known at the state level and can then be shared with other regions.

Multi-Modal & Transit

While developing a multi-modal focus for the state/region may be difficult due to the multi-State nature of CVO systems and the fragmentary nature of Regional transit systems, it is an attainable (and desired) goal. Given the rapid proliferation of ITS technologies throughout the transit and CVO communities, a multi-modal focus should be central feature of ITS strategic plans.

Focus on Needs, not Available Technologies

Finally, make sure that the ITS Strategic Plan does not involve "technology in search of a problem"; should be taken that needs are identified first, so that potential ITS solutions can be identified that address the needs (not vice-versa). Therefore, one of the most important aspects to consider when developing an ITS Strategic Plan is to make sure that ITS solutions are "connected" to the identified transportation needs (i.e., traceability). For example, one stakeholder thought that their strategic plan was innovative at the time in that it was needs-focused, rather than technology-focused; this approach made the plan's recommendations more amenable to ITS Architecture development in subsequent years. In addition, transportation problems that are identified need to be specific in terms of their location and nature in order to better gain elected official support.

PERFORM REGIONAL INVENTORY & DEFINE NEEDS

Needs Assessment and Regional Inventory

Regional needs and problem identification must come from the bottom up and be defined by those who are closest to them the stakeholders of the region, their elected officials, Agency staffs responsible for the transportation system, and the customer (e.g., commuters, long-distance travelers, community residents, tourists/visitors, bus riders, etc.). As a component of the needs assessment, the region needs to conduct a comprehensive system inventory and transportation assessment. This assessment will provide understanding of what the region currently has, and will allow the further identification of "gaps".

To develop this system inventory, planners need to review existing transportation planning documents, conduct stakeholder workshops/interviews, and distribute survey forms to their respective target audiences. With this information in-hand, planners can create tables, graphical map displays, and visuals of needs and inventory results to facilitate analysis and outreach activities.

After identifying the needs the planners can organize individual needs into broader categories (e.g., User Services, Market Packages, etc.) to clarify the context in which it is more fully

understood. With direct Stakeholder input, the next step is to prioritize the needs. Finally, the stakeholders should "map" the needs to potential ITS solutions to begin to develop an ITS vision for the Region.

Rural Environment

Rural areas contain a set of unique transportation-related needs that cannot easily be addressed by traditional design/build methods. Therefore, the needs found in rural areas should be examined and addressed to ensure a consistent level of service for all roadways across the State/Region. For example, using a location-based, needs driven approach, one State DOT was able to focus more attention on Rural ITS applications and on applications other than congestion relief; this helped to sell ITS to a broader range of stakeholders.

DEVELOP ITS VISION

By using the National ITS Architecture's "User Services" and "User Service Objectives", the planners can reduce their efforts and streamline the process of developing their ITS vision. It is recommended that workshops and focus groups be conducted to develop goals and objectives for the ITS program that map to the identified needs. It is also useful for the goals and objectives to be associated with short-, medium-, and long-term solutions and cross-referenced to individual user services and user service bundles (categorized by Rural and Urban categories).

The ITS user services objectives should be defined on a regional basis. They should address specific objectives, meet customer needs, and target solutions to specific problems

IDENTIFY/SCREEN MARKET PACKAGES & ITS CONCEPT PLAN

The first activity within this step is to develop performance criteria or measures-of-effectiveness (MOEs). These are used to assess system performance criteria and evaluate the potential value and feasibility of Market Packages under consideration. It is important that these MOEs are practical in nature and easily quantifiable to allow for subsequent evaluation.

Planners should make use of the National ITS Architecture's "Market Packages" in order to minimize the work effort and streamline the decision-making process. Stakeholders can screen the Market Packages through a series of assessments and analyses as follows:

- Environmental Scan: Analyze what Regions/States with similar characteristics selected
- SWOT Analysis: Consider the Regions'/States' strengths, weaknesses, opportunities, and threats to deploying ITS
- Goals Mapping: Analyze each Market Package to determine its ability to meet the identified Region-/Statewide transportation goals, objectives, and problems

By documenting the results of the screening process, a clear association between Market Packages and the identified needs/problems can be developed. It is important that these

associates are recognized early in the concept development process so that ITS Project ideas can be carried forward into the systems development and implementation stages. Planners can then distribute the selected Market Packages by location (e.g., Statewide, Region-wide, Corridor-wide, County-specific, Local, etc.) and prioritize them by short-, medium-, and long-term implementation timeframes.

IDENTIFY DESIRED FUNCTIONAL CAPABILITIES & POTENTIAL PROJECTS

Functional Requirements

The region should use the system goals/objectives as the initial source of desired system functionality. Through an iterative process, stakeholders can develop the state's/region's fundamental system functional requirements by breaking down previously documented system goals and objectives. These fundamental system functional requirements should then be allocated to functional areas necessary to support the system.

One of the first steps is to identify the Urban and Rural ITS functions to incorporate in the region/state. With stakeholder involvement, the planners should define what the system should do, performing requirements, and who is responsible for making it all work. Information for this "concept-of-operations" can be drawn from material developed as part of the National ITS Architecture and enhanced with additional information developed locally by stakeholders and/or consultant support.

ITS Projects

The next step is to make the transition from Market Packages to ITS Projects by identifying initial ITS project elements that cover specific geographic areas, determining specific location(s) for deployment, and assigning Agency roles/responsibilities (e.g., procurement, deployment, O&M, etc.). At this stage, the planners should begin to consider technology options and start to identify concrete project implementation timeframes (i.e., short-, medium-, long-term).

Stakeholders should relate the ITS projects back to the needs/problems and goals/objectives identified earlier in the process to make sure that the ITS Strategic assessment is still on-track. As appropriate, it is recommended that ITS projects be defined early in the planning process to keep stakeholders actively engaged.

DEFINE ITS REGIONAL FRAMEWORK INCLUDING ARCHITECTURE

The planners should take advantage of FHWA's investment in the National ITS Architecture, supported training, and technical assistance to minimize the work effort and streamline the decision-making process. The planners should schedule/conduct workshops to educate stakeholders on the National ITS Architecture (and its components) and the Regional ITS Architecture (and its deliverables).

When developing the Regional ITS Architecture, stakeholders should consider undertaking the following tasks:

- Map existing systems and connections to the National ITS Architecture
- Group selected Market Packages into subsystems and map to the National ITS Architecture
- Identify and classify connectivity between subsystems
- Review individual Market Package Architecture Flows and tailor to the region/state
- Tailor connections between subsystems to reflect actual agency relationships (i.e., Organizational Architecture)
- Identify appropriate ITS Standards and status of development activities

Regional ITS Architecture deliverables should be agreed-upon prior to project initiation and specifically identified through agency MOUs and/or consultant contract/SOW. The Regional ITS Architecture for a large geographic area needs to be developed at a level of detail appropriate for the budget, and the understanding that further deployment efforts may be needed to enhance the base architecture.

DEFINE OPERATIONAL & IMPLEMENTATION STRATEGIES

Within this activity, the planners should review, document, and evaluate the state-of-the-art of the available system components and technologies. This includes their system interaction, interconnection, and integration capabilities, life-cycle costs, and O&M considerations. Then, specific technologies should be applied to short-term or Early Winner projects only.

It is important that the planners recognize that rapid technological advances are taking place in the ITS industry, temper recommendations accordingly, and ensure that selected technologies are consistent with the Regional ITS Architecture.

REGIONAL ITS IMPLEMENTATION PROGRAM

The Regional ITS Strategic Plan should focus on a list of ITS projects to deploy, their implementation timeline (i.e., short-, medium-, and long-term), integration approach, available funding sources, and procurement methods. The plan should also outline the institutional framework to deploy, operate, maintain, and manage the Regional ITS system (e.g., approach, roles, responsibilities, etc.). In addition, it should serve as the primary resource in the on-going consensus building associated with the ITS Program. Furthermore, it should be used as a primary source of input for inclusion in the next updates of the RTPs, TIPs, and other transportation planning documents.

OUTREACH ACTIVITIES

Once the ITS Strategic Plan is complete, it is necessary to gain further acceptance from elected officials, travelers, and other community members. Adequate time needs to be reserved at the

end-of-the-project to make presentations to Agency officials (e.g., Transportation Technical Advisory Committees (TTACs), County Board of Supervisors, etc.) in order to ensure program approvals and obtain their continued support. In addition, stakeholders should distribute ITS newsletters, brochures, and videos as an effective tool for ITS education/awareness.

For further information on the Lessons Learned from other ITS Strategic Plans, please refer to each Case Study's "Lessons Learned" section (Appendix A) and each Survey Form's Question #15 (Appendix B).

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Appendix A

In Depth Description of Case Study Projects

Arizona Strategic Plan for the Statewide Deployment of ITS

Goals

To promote Arizona as a test bed for ITS solutions due to its predominantly rural character, the unique transportation characteristics of its highway network, the significant geographical and climatic variations across the state and the high volume of out-of-state visitors. With these factors in mind, the Arizona Department of Transportation's (ADOT) *Strategic Plan for Statewide Deployment of Intelligent Transportation Systems* was designed to serve as a roadmap for ITS technologies in Arizona's rural areas. The plan was developed to address the following goals:

- Develop a strategic plan for deployment of ITS in rural Arizona
- Build a long term coalition of stakeholders in both Arizona and neighboring states
- Create a compatible and integrated system of its technologies throughout Arizona and with the boarding states of, California, and New Mexico

Approach

ADOT undertook its second rural ITS study which complements the ongoing efforts of the Early Deployment Plans (EDP) for the recently completed I-40 ITS Strategic Plan as well as additional early deployment plans for Maricopa and Pima counties. The main objective of the study was to complete the state's ITS early deployment planning efforts by conducting a comprehensive, statewide research of rural transportation-related needs and issues that could be addressed through deployment of ITS technologies. The Strategic Plan serves as a guide for implementing ITS technologies and programs throughout the state.

Rationale Behind the Strategic Plan

The development of The Strategic Plan for Statewide Deployment of Intelligent Transportation Systems in Arizona addresses the need for improvements in surface transportation through technological advancements as defined by the Intermodal Surface Transportation Safety Act (ISTEA). ADOT in conjunction with the FHWA initiated the Strategic Plan in October of 1997. This is the second rural ITS study undertaken by ADOT and was launched shortly after the completion of the I-40 Strategic Plan and coincides with the continued efforts of AZTECH, who may eventually lead the statewide ITS planning efforts, and the Freeway Management Systems in Phoenix. Additional support and project guidance was provided by The Technical Advisory Committee (TAC) composed of representatives from ADOT, FHWA, and the Arizona Department of Public Safety.

ADOT's main objective included completing the state's ITS early deployment planning efforts by conducting an extensive, statewide research of rural transportation-related needs and develop ITS solutions for the addressed needs. The study area is comprised of the state of Arizona excluding the I-40 corridor and metropolitan Phoenix and Tucson.

Approach to Developing the Strategic Plans

Several broad guidelines were developed by ADOT to ensure a well-defined and integrated Strategic Plan was developed. The first steps entailed the development of an extensive list of stakeholders complied by ADOT that included:

- Government agencies (federal, state, county, and municipal)
- Regional government councils/planning groups
- Native American communities and organizations
- Community, tourists and traveler information services
- Educational institutions
- Private trucking and transportation companies and associations
- Emergency Management Services (EMS) and assistance providers
- Media

ADOT then pursued the public relations plan for The Strategic Plan with a focus on rural applications of ITS technologies and how such solutions would benefit Arizona's transportation systems. The public relations plan served as an educational tool for informing and encouraging participation of statewide rural transportation stakeholders and the media. Through a proactive communications outreach process the public relations plan was distributed via several community presentations, press releases and project newsletters, which also served as a means of soliciting stakeholder input. The state was divided into three coalition areas; the Western Desert Coalition, East Central Mountains Coalition, and the Southeastern Boarder Coalition as a means of tailoring three architectures for these specific areas. Participation and input from users was crucial to the success of the study therefore, Technical Advisory Committee (TAC) meetings, Coalition meetings, focus group workshops and six outreach presentations were structured to encourage participation from attendees so that a sufficient amount of input from users would be incorporated into The Strategic Plan. Stakeholders who did not attend the meetings were still able to provide input to the study by directly contacting the TAC. The ADOT Community relation's office collaborated closely with the TAC by maintaining public relations throughout the development of the plan.

With the completion of the initial public outreach process the next step included, identifying the critical transportation needs, problems, and opportunities within the rural areas of the state and applying the appropriate technological solution. The needs assessment efforts included holding four public focus groups and two Rural Intelligent Transportation workshops. The main goal of the workshops were to further inform and educate local government agency staff, public safety and transportation leaders about the potential solutions of Intelligent Transportation Systems while at the same time compiling a list of user needs. Those who lead the workshops included participating consultants, university professors and member from the FHWA.

Feedback and findings were placed into a database and were condensed into 76 critical needs and placed into Critical Program Areas (CPA). The CPA served as means for prioritizing and placing the needs with the appropriate user services as defined by The National ITS Architecture. The National ITS Program defines the term users "as a wide range of individuals and organizations including drivers, travelers, service providers and transportation policy makers."

The five-step process below further clarifies how the needs were derived and placed with the users services:

- Stakeholder Input Through focus Groups
- Comprehensive Listing of Problems and Concerns
- Generalized Problem Statements
- Derived Corridor Needs – ITS User Services
- Selected User Services

Contents

The study identified the needs of Arizona's rural transportation stakeholders and has matched them, where possible, to one or more of the ITS market packages as defined by the National Architecture. Of the 56 market packages currently defined by the National Architecture, 43 were identified as suitable for deployment in Arizona.

Projects and Activities

Phase 1 (1999-2001) of the Strategic Plan For Statewide Deployment of ITS includes activities in the following areas:

- **Broadcast traveler information** including the provision of an interface to public broadcast media and the coordination and expansion of driver information dissemination with neighboring states
- **CVO fleet maintenance** including the installation of electronic clearance stations in most of Arizona's Ports of Entry, the coordination of in-vehicle device use (for example, AVI and AVL) with the trucking industry and equipping maintenance vehicles with automated vehicle status mileage and fuel reporting features
- **Electronic clearance** of commercial vehicles meeting selected criteria using PrePass technology and the use of weigh-in-motion (WIM) to identify potentially overweight vehicles
- **Emergency response systems** including the evaluation of free-standing call boxes along remote rural routes and the installation of emergency phones in rest areas and bus stops, the revision of ADOT and EMS practices to comply with opportunities provided by E911, the provision of computer-aided dispatching for law enforcement and EMS agencies, CCTV and audio monitoring of rest areas and border crossings, an increase in motorists service patrols along remote rural routes and the installation of traffic signals pre-emption systems
- **Emissions and environmental hazards sensing** including the installation of visibility sensors and other weather alert systems linked to VMS to alert drivers to adverse weather
- **Fleet administration** including the coordination of ADOT maintenance scheduling to improve effectiveness and the exchange of data between ADOT, other public-sector and private-sector fleet management centers
- **Freeway control** including Traffic Management Center (TMC)-to-TMC wireline or high-bandwidth wireless communications for traffic data and making improvements to "truck route" signing

- **Incident management systems** including the evaluation of systems to improve the incident location process and the establishment of common communications channels within Arizona and with neighboring states
- **Interactive traveler information** including the continued deployment of the Highway Closure and Restriction System and the exploration of information dissemination opportunities provided by cable TV and cellular telephone services
- **International border electronic clearance** including the tracking of commercial vehicles through NAFTA corridors and improvements to CCTV surveillance at Ports of Entry
- **ITS planning including** the standardization of ITS data collection and processing methods between agencies and the development of a centralized, on-line GIS-based database of traffic information
- **Network surveillance** including the installation of additional CCTV cameras and other detectors (loop, acoustic and video), the establishment of a toll-free number to allow travelers to report traffic incidents and the introduction of vehicle speed monitoring and display to alert drivers to their current speed
- **Surface street control** including synchronization of traffic signal systems
- **Traffic information dissemination** including exploring different ways to disseminate traveler information (including portable VMS, small LED-type information displays coupled with kiosks and web-based tourist and traveler information systems) and the development of an statewide information clearinghouse(s)

Architecture Issues

Although The Strategic Plan for Statewide Deployment of Intelligent Transportation Systems was built upon the I-40 Strategic Plan, a comprehensive effort was made to recognize the varied and unique needs of the statewide users. Therefore a separate framework was developed by ADOT that focused on a comprehensive statewide architecture for deploying integrated and interoperable ITS technologies. In addition to the I-40 area, three regional architectures were created, one for each of the areas in the statewide effort: the Western Desert Coalition, the East Central Mountains Coalition, and the Southeastern Boarder Coalition. User needs were identified based on the three areas through a series of stakeholder meeting, focus group and two Rural ITS Workshops. A consultant then mapped out the user needs and placed them with the 30 appropriate user services as defined by the National ITS Architecture. In addition to the 30 user services 6 rural user services were developed by the Advanced Rural Transportation Systems (ARTS) to better suit the unique needs of rural areas. Following the selection of the appropriate user services, market packages corresponding to the selected user services were identified, which would serve as building blocks for the statewide architecture.

The National ITS architecture was complied with while developing the regional architectures through the use of a database to map architectural relationships. Adherence to the National ITS Architecture provided data flows between the regional and national levels that were not initially identified and included.

Exhibit 1 further illustrates the development of the statewide architecture process:

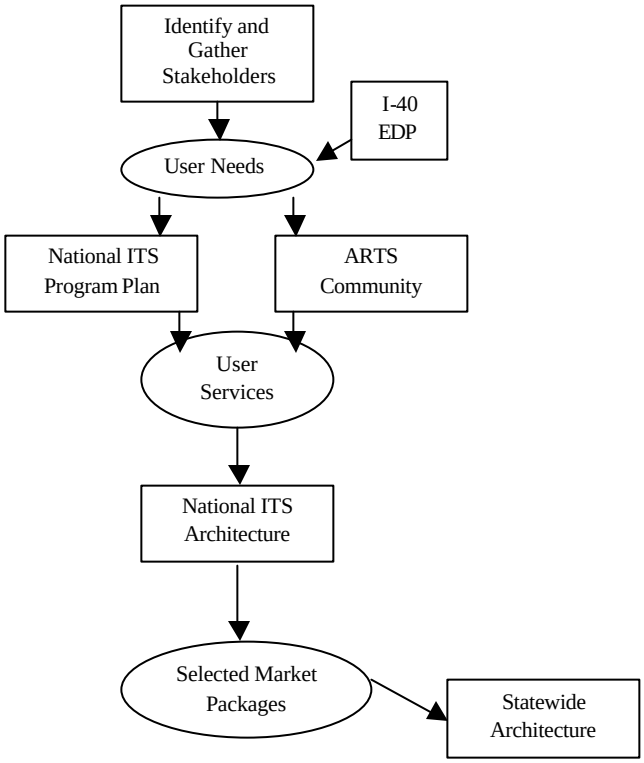

Exhibit 1 – Arizona Statewide Architecture Development Process

Institutional Involvement

ADOT's community relations office along with consultant support established and maintained a comprehensive list of stakeholders and divided the stakeholders into three separate coalitions; the Western Desert Coalition; the East Central Mountains Coalition and the Southeastern Boarder Coalition. The list served as a method of identifying participants for Coalitions and focus groups as well as a mailing list for newsletters, flyers and meeting announcements. Arizona's stakeholders identified for this study included representatives from:

- Government agencies (federal, state, county, and municipal)
- Regional government councils/planning groups
- Native American communities and organizations
- Community, tourist and traveler information services
- Educational institutions
- Private trucking and transportation companies and associations
- Emergency Management Services (EMS) and assistance providers
- Media

Appendix A – Case Studies

Organizational Issues

Although a formal management team had not yet been chosen, the plan anticipates that it would be logical that the Metropolitan Planning Organization and councils of Government with ADOT's lead, be responsible for overseeing the future statewide ITS program in Arizona. Additional support and planning efforts would be provided by the AZTech program, which may eventually become known as the ITS program for the entire state. On the regional level the plan recommends that the district engineer with experience with communication systems oversee the maintenance and operations of the deployed ITS technologies.

Outreach & Marketing

The initial outreach process by ADOT included a series of stakeholder meetings designed to educate and inform stakeholders of the benefits of ITS solutions as well as address the needs of the stakeholders. In addition to the stakeholder meetings a proactive communication program was launched by the ADOTs community relations office. Project newsletters and public forums/presentations were used to inform, educate and solicit input from highway users and stakeholders throughout the state.

ADOT along with the FHWA sponsored two Rural ITS Workshops and four focus group meetings throughout the state that were designed to further educate and give attendees a more detailed look at ITS solutions. During the workshops and focus group meetings a significant amount of time was spent identifying and refining the needs of the users. The following groups participated in the workshops and focus groups:

- ADOT District staff
- ADOT Transportation Planning Group
- Mayors, city council persons, and other key city staff
- County supervisors
- Tribal leaders
- Major Transportation industry representatives
- Department of Public Safety representatives
- Office of Tourism representatives
- Chambers of Commerce
- National Parks
- Representatives of major private and public tourist attractions
- The general public

Education Activities

The Western Institute of Transportation Institute along with Arizona State University, Northern Arizona State and the University of Minnesota all participated and followed the project through meetings and newsletters.

Funding Opportunities and Sources

The plan briefly states the level of private funding is estimated at 2.5 times the public investment, which is approximately $233 million over the next 20 years. Private funding sources were not mentioned.

Appendix A – Case Studies

Current Status

The *Strategic Plan* has been completed and plans for implementing systems highlighted in Phase 2 are moving forward. Currently Arizona is in the deployment and operational stages of the following projects:

- Alternate Route Interactive System
- Advanced Snowplow Operations
- Variable Speed Limit Signs
- Dynamic Message Signs
- Road and Weather Information Systems
- Commercial Vehicle Operations

Future Activities Planned

A long-term evaluation plan has been developed by ADOT, however ADOT will identify the organization that will be responsible for conducting the evaluation process. The responsible agency could be one of the following, ADOT, a non-profit entity interested in promoting ITS throughout the state, a state university, a coalition of Councils of Governments, or a consultant.

The long-term evaluation plan will test the effectiveness of the deployed ITS technologies in rural Arizona, through the short, medium, and long term deployment process and will address the following.

- Assess or quantify improvements in transportation service and performance
- Identify which ITS projects have been more productive in improving transportation service and performance
- Identify possible enhancements to ITS systems deployed in the state
- Recommend geographic expansion of individual projects and systems in future years

Evaluation reports will be shared with the Technical Advisory Committee members and the key stakeholders on each project. Positive results will help strengthen support between the public sector partners, private sector partners, key stakeholders and the general public.

Furthermore performance measures will evaluate how well system-wide objectives were met on a quantitative and qualitative basis. The performance criteria will consist of the following measures.

- Number of trucks stopped at the ports of entry
- Number of truck by-passing the POE, due to lack of capacity
- Number of trucks by-passed because of prior clearance
- Mayday performance
- Mayday system coverage
- Coverage of driver early warning systems
- Emergency service call-outs
- Number of "hits for traveler information web pages (www.azfms.com)
- Number of calls to 1-888-411-ROAD number
- Accident rates
- Availability of traveler information

- Coverage of driver early warning systems
- Number of fatal accidents
- Number of visitors
- Timelines and traveler data
- Tow truck service calls
- Availability of traveler information
- Conformance/response to messages
- Customer survey data
- Level of service

Additional systems are highlighted within the *Strategic Plan* as those which will be implemented and deployed in Phase 2 and by 2008 and beyond and are as follows:

- Commercial Vehicle Administrative Processes
- Dynamic Toll/Parking Fee Management
- Emergency Routing
- HAZMAT Management
- Information Service Provider-Based Route Guidance
- Lateral Safety Warning
- Longitudinal Safety Warning
- Mayday Support
- On-board CVO Safety and Roadside CVO Safety

Participating Institutions

Public:	Arizona Association of Governments, Arizona Department of Public Safety, Arizona Department of Transportation, Arizona Division of Emergency Management, Arizona Office of Tourism, Arizona State Parks, Chambers of Commerce, Cities and Towns, Counties, Department of Corrections, Federal Highway Administration, Marine Corps Air Station, Metropolitan Planning Organizations, National Park Service, Native American Tribes, Police, Private citizens, Radio Stations, Railroad, Rural Fire Department, Western Transportation Institute, Arizona State University, Northern Arizona University, University of Minnesota and U.S. Forest Service.
Private:	Kimley-Horn and Associates, Inc.

Cost Information

Title	Date	Public Sector for The 15 Year Period	Private Sector
Strategic Plan For Statewide Deployment of Intelligent Transpotation System in Arizona	December 1998	*$108,478,000*	Unknown

Appendix A – Case Studies

Lessons Learned

Although developing a Statewide ITS Architecture is a complex task, the state of Arizona created ITS solutions by way of establishing the appropriate scope and focused leadership. The following steps helped to properly address the needs of the users and facilitate successful ITS solutions.

- Create Manageable Regional Coalitions
- Develop and identify a wide range of stakeholders
- The use Community Relations Office helped to refine user needs
- Create and maintain agency and public buy-in
- Utilize resources such as, knowledgeable and experienced consultants, the National ITS Architecture, and technological alternatives to face to face meetings

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Central Coast ITS Strategic Deployment Plan

Goals

The Central Coast Region of California has just completed its initial ITS investigations with the results placing a significant emphasis on planning, deploying, and coordinating ITS initiatives throughout the Region. Specific objectives for the Central Coast Region include the following:

- Integrate ITS systems/technologies into the transportation system on a strategic basis
- Address congestion and safety problems
- Enhance emergency preparedness
- Provide pre-trip and en-route traveler information
- Improve the efficiency and effectiveness of Agency operation and maintenance activities
- Support transportation planning and system management functions
- Ensure ITS deployments are aesthetically-pleasing

Approach

Organizational Approach

The Central Coast ITS Strategic Plan was established to take advantage of available funds from the California Department of Transportation (Caltrans) to forward the deployment of a coordinated, statewide ITS program. Initially, Caltrans' ITS focus has been on its major metropolitan areas but since 1995, it has been setting aside ITS planning funds for various geographic regions in more rural environments. The project's 5-County study area (Santa Cruz, San Benito, Monterey, San Luis Obispo, and Santa Barbara) is encompassed within the jurisdiction of Caltrans District 5. When Caltrans District 5 became aware that ITS opportunities were available from a statewide perspective, they ensured that funding was available for the Central Coast's ITS strategic planning effort. It was felt that since Caltrans District 5 and a number of other Central Coast transportation agencies had already or were starting to deploy certain ITS systems/technologies, that funds spent to coordinate these efforts on a regional basis would provide for a seamless transportation network and scale-of-economies. In addition, coordinated planning early-on in the process would allow each County a better chance of securing funding for future deployments by mainstreaming ITS projects into their traditional planing/programming process.

Technical Approach

The Consultant's technical approach to the Central Coast ITS Strategic Plan is listed below:

- Outreach & Consensus Building (via focus groups, interviews, surveys, phone calls, questionnaires, web-sites, newsletters, awareness seminars, brochures, etc.)
- Inventory Existing Transportation System/Projects
- Determine User Needs & Challenges
- Develop ITS Vision
- Develop ITS Market Package Plan

- Develop Regional ITS Architecture & Functional Requirements
- Screen Technology Options/Alternatives
- Identify Early Winners
- Develop Strategic Plan [including specific project location(s), responsible agencies, cost estimates, implementation schedule, etc.]

The above steps are graphically depicted in "Exhibit 1 - Central Coast Task Interrelationship Diagram" and "Exhibit 2 - Central Coast ITS Study Process" diagram presented at the end of this case study.

Contents

The contents of the Central Coast ITS Strategic Plan focused on identified needs and opportunities, Market Package selection, Regional ITS Architecture development, and recommended ITS Projects. Basically, the guiding thought process used to develop the Strategic Plan's contents is based on the "Goals & Objectives" presented above. To summarize the Strategic Plan's contents, the Central Coast's ITS Strategic Direction is presented below from the Regional perspective. The reader is directed to the actual Central Coast ITS Strategic Plan for a County-by-County view.

Central Coast Regional ITS Strategic Direction

- Establish a Transportation Management Center (TMC) to coordinate Regional ITS activities
  - Monitor traffic flow and roadway conditions via roadway sensors and closed circuit television (CCTV) cameras
  - Control ramp meters to improve traffic flow on congested roadways
  - Serve as a focal point for regional multi-modal traveler information using changeable message signs (CMS), highway advisory radio (HAR), and kiosks to allow long-distance traffic and residents to avoid major incidents and road closures
  - Improve coordination activities concerning incident management, special events management, CHP/Caltrans dispatching, and other Regional and Local TMCs
- Increase the availability and quality of multi-modal traveler information though enhancements to Internet websites and telephone call-in systems
- Improve traffic flow along arterial roadways through signal upgrades, communications enhancements, and coordination strategies
- Provide for a consistent "smart card" approach for seamless operation among transit systems, parking systems, and toll operations
- Use the Internet to its maximum potential to share information between Agencies and with the public
- Encourage and work with communications companies to expand cellular phone coverage into more rural areas to support a range of information delivery options and "mayday" applications

- Support enhancements and upgrades to CHP and emergency response agency radio systems
- Improve emergency vehicle response times and transit vehicle schedule adherence through traffic signal priority/override systems
- Expand the motorist aid call box system on targeted roadways
- Use "smart" call boxes at selected locations that equip existing call boxes with roadway and/or weather sensors

Architecture Issues

One important component of the Central Coast ITS Strategic Plan was the development of the Regional ITS Architecture. The step-by-step process used is graphically depicted in "Exhibit 3 - Central Coast Architecture Development Process" diagram presented at the end of this case study. As can be seen, the initial steps focused on the following Central Coast-to-National ITS Architecture "mapping" exercises:

- Identified needs/problem areas to User Services and Market Packages
- Existing transportation systems to the Physical Architecture

From this foundation, certain components of the National ITS Architecture were then specifically "tailored" to the Central Coast to form the Regional ITS Architecture described below:

- Functional Architecture (Planned)
  - User Service Plan
  - Market Package Plan
  - Diagrams presenting the selected Market Packages, their interrelationships**,** and links to ITS Projects
- Physical Architecture (Existing & Planned)
  - Tailored “sausage” diagrams (subsystem interconnect diagrams) that present the selected Market Packages, links to ITS Projects, and interconnections
  - Diagrams created for each County
- Turbo Architecture Database File (Existing & Planned)
  - System Inventory
  - Market Package Association
  - Organizational Architecture
    - Tailored subsystem interconnect diagrams
    - Diagrams present the hierarchical interactions between Agencies and their systems/projects
  - Architecture Flow Diagrams
    - Tailored data flow diagrams between subsystems
    - Represent Existing or Planned system flows

This Architecture Development Process was used in the Central Coast for the following reasons:

- Participants were comfortable with the balance between the selection of ITS Projects and the process used to identify them
- Anticipation that "new" Federal planning regulations were being enacted that required conformance with the National ITS Architecture
- Assurance from their FHWA representative that the Central Coast process was far along the path to Architecture conformance, especially through the use of Turbo Architecture
- Understanding that conformance with the National ITS Architecture and use of current/emerging standards would ensure that their ITS Projects were eligible for Federal funding

The Central Coast decided upon these Architecture deliverables for the following reasons:

- Initially, the scope-of-work (SOW) asked for by the Central Coast Agencies and presented by the Consultant were not specific enough to develop deliverables in conformance with the National ITS Architecture
- Therefore, a meeting between AMBAG, Caltrans, FHWA, and the Consultant was conducted at the beginning of the Architecture portion of the project:
- Determined Regional ITS Architecture deliverables (above)
- Development of the Regional ITS Architecture would be "on-hold" until the FHWA's "Turbo Architecture" software program was available for use
- Turbo Architecture would establish the Central Coast far along the path to Architecture conformance
- Turbo Architecture would allow various architecture "perspectives" to be developed (e.g., Central Coast Region, AMBAG jurisdiction, each County, etc.)
- Turbo Architecture would ensure that each County/Agency could manage their Architecture portion as well as "bubble-up" pertinent components that were of Regional significance

Institutional Involvement

The Central Coast ITS Program is based on the active participation of the public sector, private sector, and academia. The program has successfully brought together different offices in Caltrans, CHP, FHWA, AMBAG, five (5) Counties, local Cities, transportation agencies, and transit properties to further ITS deployment in the Central Coast. Public sector interaction is presented in the "Organizational Issues" below.

At this time, participation of the private sector has been solicited through a series of interviews/workshops to determine their needs, ITS Project ideas, and areas of potential involvement. It is envisioned that future involvement will consist of traditional Request For Proposal (RFP) solicitations and through more innovative mechanisms such as public-private partnerships.

Academia support was provided by the University of California Polytechnic Institute (Cal-Poly). Cal-Poly participated in most ITS Steering Committee meetings and is furthering an ITS Research & Development (R&D) project that focuses on the use of low-cost ITS applications to improve transit system operations in and around San Luis Obispo County [e.g., automated vehicle location (AVL), coordinated dispatching, schedule adherence, transit information dissemination via kiosks and call-in systems, etc).

Organizational Issues

The Central Coast's organizational structure was defined to maximize participation from public agencies, private sector, and academia. This structure and lines of decision-making continue to evolve as the ITS Program develops. Current organizational structures are as follows:

- **ITS Steering Committee** - Members include key technical staff from the involved public agencies and served as the decision-making body for ITS Program direction, Regional ITS Architecture development, and for establishing consensus among participating stakeholders
- **ITS Coordinating Group** - An offshoot of the ITS Steering Committee that will continue in a post-Strategic Plan role to assist ITS deployments, guide ITS investments, and update the ITS Strategic Plan
- **ITS Video Review Board** - Sub-group of the ITS Coordinating Group that will comment/review the video's content, format, and style/look
- **Technical Working Committees** - Sub-groups of the ITS Steering Committee that focused on the ITS Strategic Direction for specific technical areas (e.g., Architecture, Communications, Transit, etc.)
- **County/Agency Technical Advisory Committees (TTACs)** - Existing Agency structures used to gain consensus on the jurisdiction's ITS Strategic Direction, recommended ITS Projects, and budget forecasts
- **County/Agency Boards** - Existing Agency structures that have decision-making authority to "mainstream" recommended ITS Projects into the traditional planning/programming/investment process

Outreach, Marketing, & Education Activities

The Central Coast project contained an extensive outreach, marketing and education program that consisted of the following activities:

- Monthly ITS Steering Committee meetings to discuss program status, determine program direction, and build Agency consensus
- Individual interviews and workshops with ITS stakeholders (public and private) to identify needs and ITS Project ideas
- Series of ITS educational workshops targeted at ITS stakeholders (public and private) to promote what ITS is, what ITS can do, and ITS benefits
- Creation of the ITS Newsletter (whose purpose and content paralleled the ITS educational workshops) for use as a participant "take-home" product
- Development of the ITS Brochure to educate/promote the ITS Strategic Plan's Strategic Direction, recommended ITS Projects, and Next Steps

Appendix A – Case Studies

- Presentations to Agency/County TTACs and Boards to ensure their understanding and support of the ITS Strategic Plan's contents/direction
- Use of Caltrans District 5 Internet website to post the ITS Strategic Plan, ITS Newsletter, and ITS Brochure
- Development of the ITS Video to further ITS awareness in the community and to describe the ITS Strategic Plan's contents/direction

Funding Opportunities and Sources

At the Local level, funding for the Central Coast ITS Strategic Plan will rely on Agency/County efforts to "mainstream" individual ITS Projects into their traditional planning process [Regional Transportation Plans (RTPs), Statewide Transportation Improvement Plan (STIP), Congestion Mitigation and Air Quality (CMAQ) funds, etc.]. In Santa Barbara County, the Board is discussing the creation of an "ITS Fund" that would be used specifically for ITS investments only.

Within Caltrans District 5, they have already established a 10-Year ITS Program Budget and are continually ensuring funding availability for its subsequent implementation. In parallel, Caltrans District 5 is currently using internal agency-based State Highway Operations Protection Program (SHOPP) funds to deploy portions of their ITS Program (e.g., roadway sensors, ramp meters, CCTV, traveler information via the Internet, TMC start-up investigation, etc.).

Current Status

- Agency/County TTAC and Board support for the ITS Strategic Plan (March-June, 2000)
- Central Coast ITS Strategic Plan completed (June, 2000)
- Caltrans District 5 SHOPP activities get underway (September, 2000)
- ITS Video delivered (December, 2000)
- ITS Coordination Group's first meeting (December, 2000)
- ITS Projects "mainstreamed" into traditional planning process (per project priority and as submitted before Agency/County Boards at monthly meetings)

Future Activities Planned

1. Formation of the "Central Coast ITS Coordinating Group", an off-shoot of the ITS Steering Committee that would meet on a periodic basis and provide the following role:
   - Guide ITS project planning and implementation activities
   - Provide input on ITS project design, deployment, and integration issues
   - Assess the extent to which the Strategic Plan has been implemented
2. Development of the "ITS Coordinator Position", a one-year effort to obtain ITS assistance throughout the Central Coast Region in the following manner:
   - Update both the ITS Strategic Plan and Regional ITS Architecture (at discretion of ITS Coordinating Group)
   - Assist the MPOs/COGs in updating their portion of the Regional ITS Architecture
   - Ensure ITS projects incorporate current/emerging standards
   - Prepare materials (e.g., fact sheets, newsletters, brochures) and be available for presentations on ITS to Agency and Community stakeholders

Appendix A – Case Studies

3. Actual deployment of ITS projects as identified in the Strategic Plan, for example:
   - Caltrans District 5 – roadway sensors, ramp meters, and CCTV along US 101 (Santa Barbara Co.) and SR 1 (Santa Cruz Co.)
   - SBMTD – AVL system and transit information dissemination via kiosks
   - Central Coast TMC – Traveler information and lane closures via Internet web-site

Participating Institutions

Public:	Association of Monterey Bay Area Governments (AMBAG) Santa Cruz County Regional Transportation Commission (SCCRTC) Council of San Benito County Governments (SBCOG) Transportation Agency for Monterey County (TAMC) San Luis Obispo Council of Governments (SLOCOG) Santa Barbara County Association of Governments (SBCAG) Santa Barbara Metropolitan Transit District (SBMTD) Caltrans District 5 (District 5) Caltrans New Technology & Research Program (NTRP) California Highway Patrol (CHP) Federal Highway Administration (FHWA) Federal Transit Administration (FTA)
Private:	TransCore VRPA Technologies
Academia:	University of California Polytechnic Institute (Cal-Poly)

Cost Information

The following are estimates of how much each of the Central Coast's activities cost:

Title	Duration	Public Sector Cost	Private Sector Cost
Central Coast ITS Strategic Plan	18 mos.	20 hrs. per month (per Agency staff)	$370,000
Central Coast ITS Video	2 mos.	10 hrs. per Agency	$20,000
Central Coast ITS Coordinating Group	N/A	120 hrs. per year (per Agency staff)	N/A
Central Coast ITS Coordinator Position	12 mos.	10 hrs. per month (AMBAG staff)	$80,000

Appendix A – Case Studies

Benefits

Quantifiable ITS benefits in the Central Coast are based upon FHWA's "ITS Benefits Update (September, 1999)". Actual benefits in the Central Coast will depend on a number of factors such as congestion levels and the extent of ITS system coverage. Individual benefits from ITS deployments will depend upon Agencies' subsequent evaluation efforts.

Qualitative ITS benefits in the Central Coast include the following examples:

- Development of the Regional ITS Architecture
- Strengthening of close-working relationships between ITS stakeholders across jurisdictional boundaries as evidenced by the creation of the "ITS Coordinating Group"
- Agency/County support for the ITS Strategic Plan
- Identification of recommended ITS Projects for implementation
- Assurances from Agency/County Boards to "mainstream" ITS into the traditional planning processes
- Recipient of the 1999 Award of Excellence for the "Best California Rural ITS Project" from the California Alliance for Advanced Transportation (CAATS)

Lessons Learned

From a public sector point-of-view, lessons learned include the following examples:

- Importance of bringing different public agencies, many with very diverse needs and objectives, together in a single forum to examine the potential offered by ITS solutions
- The need to involve County/Agency staff early enough in the process so that the needs of each can be addressed
- Private sector can play an important role in deploying ITS and their involvement/participation needs to be cultivated
- Funding for ITS does not just exist in some "magical pot-of-money"; but rather, ITS needs to be "mainstreamed" into the traditional planning process
- Agency/County staff will be responsible for updating the Regional ITS Architecture and for ensuring conformance when "new" ITS Projects arise

From a private sector viewpoint, lessons learned include the following examples:

- Regional ITS Architecture deliverables should be agreed-upon prior to project initiation and specifically identified in the Contract SOW
- Adequate time needs to be reserved at the end-of-the-project to make Agency/County presentations, receive their comments, and obtain their support
- The use of ITS newsletters, brochures, and videos are an extremely effective tool for ITS education/awareness and for gaining Agency and Community support
- The need to balance the ITS planning process with the selection of recommended ITS Projects is the key to maintaining stakeholder interest while satisfying Federal/State guidelines
- At the end of the project, presentations to Agency Transportation Technical Advisory Committees (TTACs) and Board of Supervisors goes a long way to ensuring awareness of and support for the ITS Strategic Plan

Appendix A – Case Studies

References and Contact Information

Documents reviewed

1. Working Paper #1 - Issues & Opportunities (January, 1999)
2. Technical Memorandum - ITS Performance Measures/Evaluation Criteria (January, 1999)
3. Technical Memorandum - Summary of Problems & Needs (March, 1999)
4. Working Paper #2 - ITS Vision for the Central Coast (April, 1999)
5. ITS Market Package Plan for the Central Coast (May, 1999)
6. Central Coast ITS Strategic Deployment Plan
   - Volume I - ITS Strategic Plan (June, 2000)
   - Volume II - ITS Project Implementation Guide (June, 2000)
   - Volume III - Project Documentation (June, 2000)
7. Central Coast ITS Brochure (Spring, 2000)
8. Central Coast ITS Strategic Plan -- Agency Presentations
   - SBCAG (March, 2000)
   - SLOCOG (April, 2000)
   - SCCRTC (April, 2000)
   - SBCOG (April, 2000)
   - TAMC (April, 2000)
   - AMBAG (June, 2000)

Please note that all documents were prepared by TransCore and VRPA.

Contact for further information

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To view the Central Coast ITS Strategic Plan and ITS Brochure:

http://www.dot.ca.gov/dist05/planning

Appendix A – Case Studies

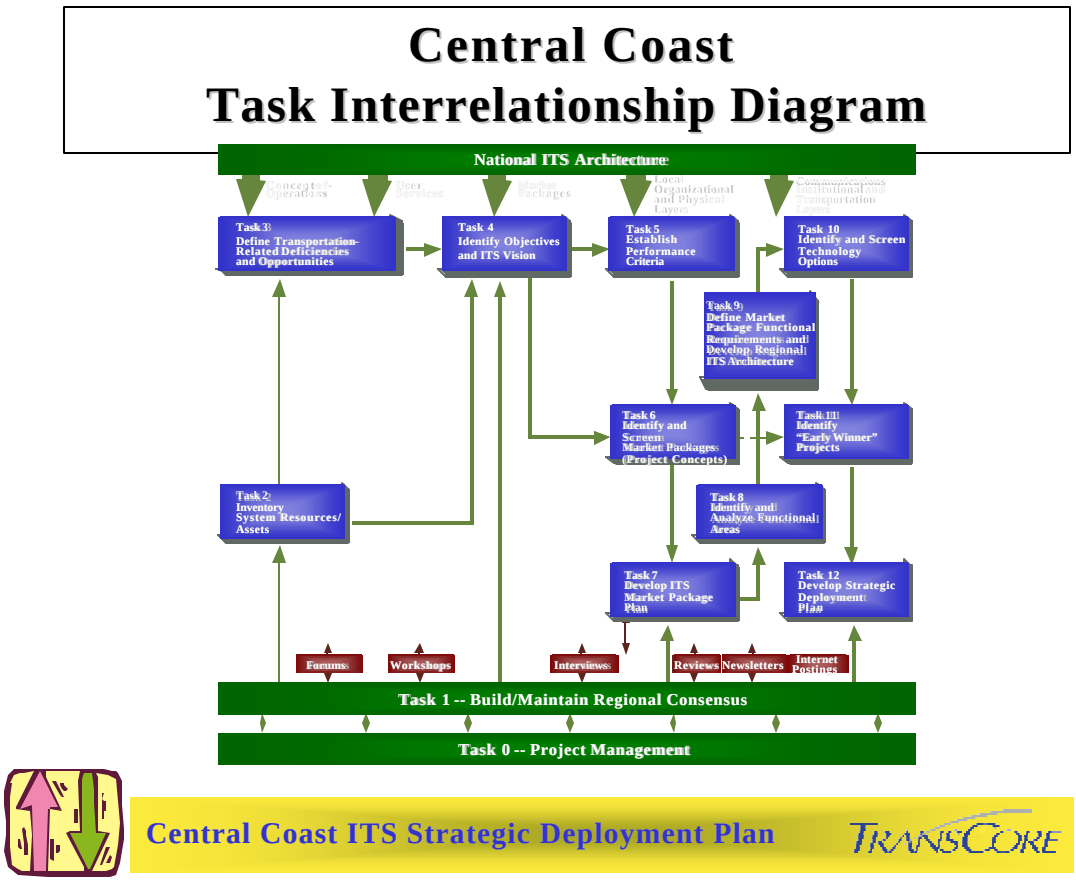

Exhibit 1 - Central Coast Task Interrelationship Diagram

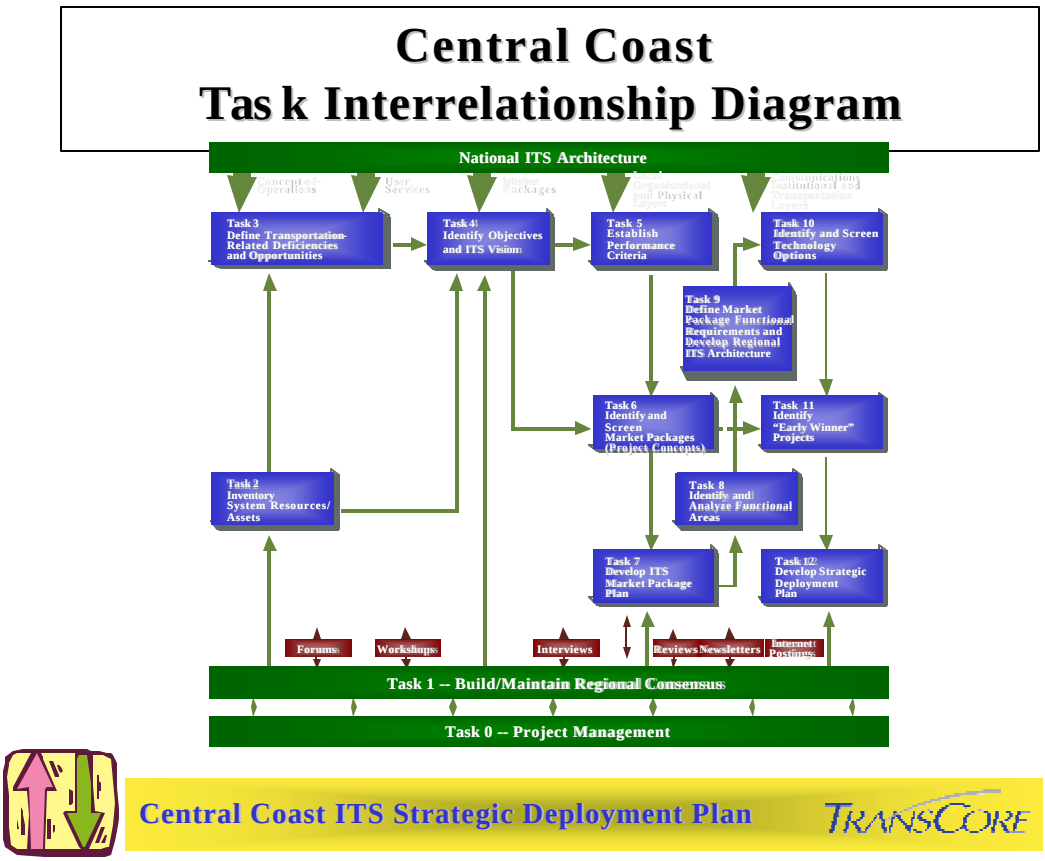

Exhibit 2 - Central Coast ITS Study Process Diagram

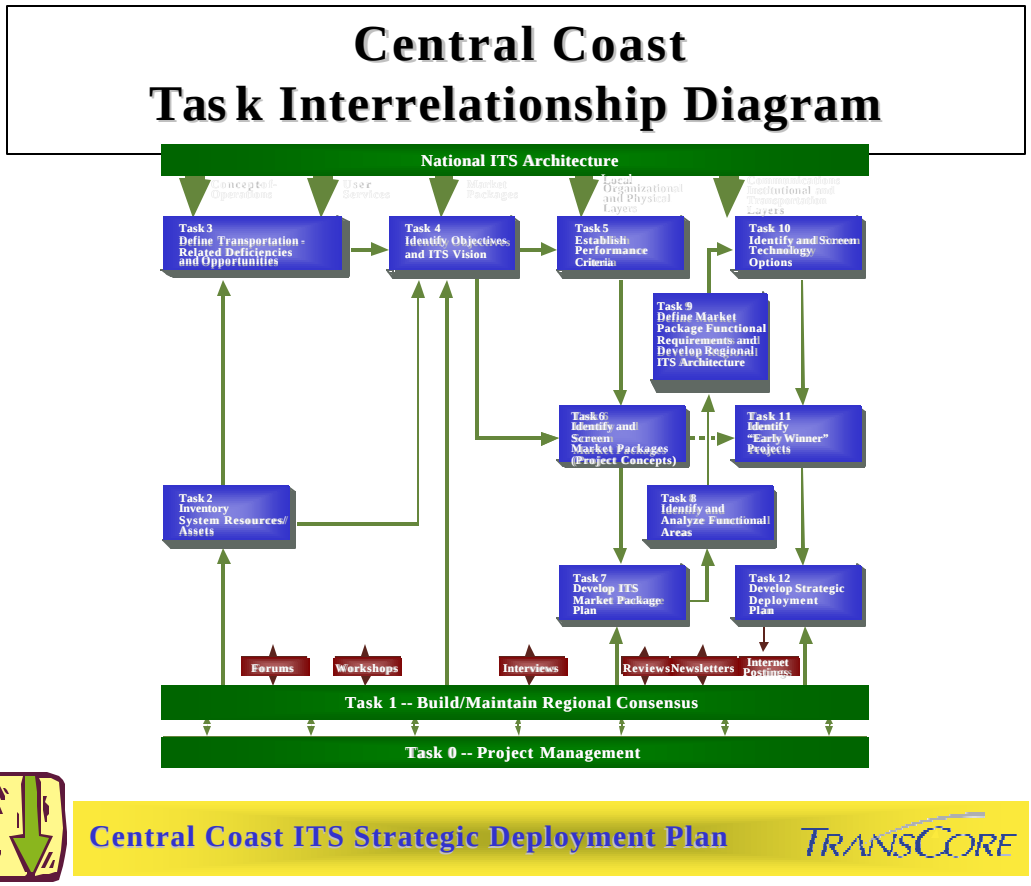

Exhibit 3 - Central Coast Architecture Development Process Diagram

Rural California/Oregon Advanced Transportation Systems (COATS) Strategic ITS Deployment Plan

Goals

Rural regions in the states of Oregon and California approximately between Eugene, Oregon and Redding, California have more in common in terms of transportation challenges with each other than with the rest of their respective states. The California/Oregon Advanced Transportation Systems (COATS) project seeks to build upon these common needs by unifying member agencies and focusing on a seamless, state-of-the art, multi-modal transportation network benefiting travelers, goods movement, economic activity, and transportation operators in Oregon and California. The project's goals include the following:

- Improve the safety and security of the Northern California/Southern Oregon Region rural transportation system users
- Enhance personal mobility and accessibility to services and enhance convenience and comfort of motorists traveling in and through Northern California/Southern Oregon
- Increase operational efficiency and productivity of the transportation system focusing on system providers
- Enhance economic productivity of individuals, businesses and organizations
- Reduce energy consumption, environmental costs and negative impacts
- Develop and foster long-term partnerships that will result in the demonstration of ITS initiatives and traditional solutions that address rural needs of the region
- Ensure compatibility with statewide and national ITS initiatives
- Incorporate ITS into the State Transportation Improvement Program planning efforts

The project is intended to provide for effective and efficient ITS development, demonstration, delivery, and the promotion of safety, mobility, trip enhancement, and environmental quality.

Approach

Organizational Approach

In 1991, the California Department of Transportation (Caltrans) investigated rural concerns dealing with advanced transportation technologies, and in 1995 initiated a Program for Advancing Rural Transportation Technologies (PARTT). This was a rural ITS scoping study that broadly identified the transportation needs and concerns of rural transportation in California. As a result of PARTT, Caltrans designated a geographic area in northern California as a study area to further refine the need and application of ITS in a rural environment. To maximize resources and foster cooperation, Caltrans and the Oregon Department of Transportation (ODOT) expanded the northern California study area into southern Oregon and partnered to investigate the feasibility of ITS throughout a bi-state study area. Federal Highway Administration (FHWA) Regional Pooled-Fund Program funds were secured to fund the project.

A business plan (1) was developed early in the COATS project that provided for the development of a Steering Committee, a Governing Board, three Regional Teams and Task Forces. These groups are discussed in more detail later.

Technical Approach

The project includes four general types of activities:

- Identifying the transportation and information needs within the study area
- Determining ITS solutions that would be beneficial, cost-effective, and implementable for demonstration within the study area on the basis of the identified needs
- Identifying, designing, demonstrating and evaluating initial, small-scale ("early-winner") projects/systems on a multi-year basis to test feasibility of rural ITS
- Developing a Strategic ITS Deployment Plan that describes a strategic approach for implementing rural ITS strategies on a larger scale

As shown in Exhibit 1 (presented at the end of this Case Study), the Strategic ITS Deployment Plan summarizes the results of these other project tasks. While other project deliverables are technical documents intended for the Steering Committee, the Strategic ITS Deployment Plan is intended for a more general audience. The focus of the plan is to describe, in broad terms, the inputs and process involved in identifying candidate projects for deployment. The plan serves as a reference point to the other project documents for readers who are interested in more detail. Using this approach will allow the results of the COATS project to be disseminated more broadly throughout the study area, even to those who have no background in intelligent transportation systems.

Contents

The plan is oriented toward the general public as well as the transportation community. Its primary purpose is to summarize previous documentation efforts done throughout the project, and in doing so provide a vision for ITS in the future. It is organized into five major parts. (References are indicated to show how project documents map to the Strategic ITS Deployment Plan.)

- The first part provides background information regarding the administrative structure of the project and various outreach efforts (1,2). It also highlights several reports that document regional transportation needs (6, 7, 8, 10)
- The second part describes a vision for the COATS region, including goals and objectives agreed to by the COATS Steering Committee (1) as well as key user services and ITS applications
- The third part highlights the regional architecture (9), in order to demonstrate consistency with the National ITS Architecture
- The fourth part looks at how the COATS vision gets put into the ground, through prioritizing project implementation (3, 4), considering operations and maintenance needs (5), and examining ITS integration issues
- The final part of the plan documents the future direction of the COATS project, which includes additional deployments, extended organizational outreach, architecture enhancement, and increased private sector involvement

Projects

An early-winner project (4) at Siskiyou Pass includes the following components, which will be integrated with existing transportation management centers in Oregon and California:

- Road and weather information systems
- Closed-circuit television surveillance
- Changeable message signs
- Information kiosks
- Regional incident management plan

This project may be expanded to include cable television traveler information and dynamic warning variable message signs (such as for vehicles traveling at excessive speeds).

Similar technologies are planned for deployment in other parts of the study area. Other technologies that have been identified as candidates for deployment include:

- Spot warning systems, such as animal-vehicle collision warning systems, visibility warning systems, and intersection advanced warning systems
- Highway advisory radio
- Motorist safety systems, such as motorist-aid call boxes and in-vehicle mayday systems
- Transit and mobility systems, such as vehicle routing and scheduling, park-and-ride lot surveillance, automatic vehicle location, and parking management systems
- Commercial vehicle systems, such as weigh-in-motion and electronic pre-clearance systems (3)

Future deployments will depend on funding levels and future direction as identified by the Steering Committee.

Principal Deliverables and Activities

The principal deliverable from the COATS planning effort is a Strategic ITS Deployment Plan, scheduled to be complete in draft form by December 2000. The following deliverables were produced during the COATS effort as products contributing to the Strategic ITS Deployment Plan. Figure 1 shows how these deliverables relate to one another and to the final Strategic ITS Deployment Plan document.

Business Plan (1), July 1998

This document provided stakeholders with a framework by which business decisions would be based and an organizational structure to support those decisions. It was important to get acceptance from all the participants on how to do business and clarify the various roles and responsibilities of the members, staff and WTI. By establishing a management structure, the interest and involvement of the COATS project members can continue.

Stakeholder Outreach Summary (2), June 1999

This report summarizes the challenges and opportunities identified at a series of workshops held throughout the COATS study area. The workshops were viewed as critical to the project's success because they promoted awareness of the opportunities ITS can offer to rural areas and created a way in which local priorities can be reflected in the statewide planning process.

Appendix A – Case Studies

Technical Memorandum One, Volume One: Review of Legacy Systems (6), November 1998

This report summarizes existing transportation systems and planned transportation improvements within the COATS region and includes them in GIS maps. This review of legacy systems, including both advanced technology-related and traditional systems, helps to avoid redundancies and to identify opportunities for building on existing efforts.

Technical Memorandum One, Volume Two: Conditions and Performance (10), November 1998

This document provides an overview of the transportation challenges in the COATS region and defines areas of geographical focus for potential solutions. The data presented in this report was subsequently used to define potential projects for implementation. By using quantifiable criteria, this report provides an engineering perspective on where certain transportation challenges are most significant.

Traveler Needs Survey Report (7, 8), September 1998

The purpose of the traveler needs survey was to document what travelers perceived to be challenges in the COATS study area, and the relative perceived value of various ITS solutions. The survey sought to establish: what information the rural traveler needs and wants, the medium through which information would be presented to the traveler, and where the traveler would want this information presented.

Project Infrastructure Report (3), March 1999

This report documents potential ITS technologies that may help to address local challenges. This was used to help educate Steering Committee and Regional Team members in prioritizing locations for infrastructure deployments out of those areas identified in the Conditions and Performance Report.

Market Package Exercise, March 1999

Steering Committee and Regional Team members were surveyed regarding what market packages they perceived to be as a priority in the COATS study area. This produced a list of priority market packages for short term and long-term deployment in the region. This was an important input into the process in order to get the more subjective perspectives reflecting the experience of the members of the Steering Committee and Regional Teams.

Operations and Maintenance Guidance Document (5), March 2000 (draft)

This document assesses the technical, financial and institutional issues associated with operations and maintenance of ITS devices in the COATS region. Consideration of these issues in advance of deployment was felt to be critical to ensure the long-term viability of ITS in the study area.

Regional Architecture Report (9), June 2000 (draft)

This document describes efforts in developing a regional architecture for the study area (see below).

Architecture Issues

The COATS project included the development of a regional architecture that is consistent with National ITS Architecture. The process used to develop this architecture is shown in Exhibit 2 (presented at the end of this Case Study). Development of the architecture was not undertaken as an independent exercise, but instead built heavily upon data collected in earlier phases of the project. Six architecture workshops were held throughout the study area to confirm and correct

information that was gathered in these earlier phases. The four steps in developing the architecture as follows.

- Identify Stakeholders and Systems. Through the Steering Committee and Regional Teams and various outreach efforts, lists were developed of existing stakeholders and systems. These lists were mapped to subsystems and terminators from the National ITS Architecture.
- Define Regional Needs and Challenges. Feedback from the architecture workshops built upon the information gathered in other project efforts.
- Craft Regional Architecture. A Communications and Information Survey was mailed to hundreds of stakeholders to identify current and future information sharing needs. The purpose of this survey was to help in building a "strawman" architecture that could be reviewed and modified during the architecture workshops.
- In identifying new ITS opportunities, the project used the National ITS Architecture market packages as an entry point for establishing what stakeholders wanted to see for ITS. Four different rankings of market packages were developed in order to reflect the perspectives of users, operators and managers.
  - Findings from the Traveler Needs Survey were adapted to develop a prioritized list of market packages.
  - Steering Committee and Regional Team members completed a Market Package Exercise (described above).
  - If a particular ITS opportunity was supported by at least three of the four stakeholder outreach workshops, it was given a priority ranking.
  - Steering Committee members also completed Project Infrastructure worksheets, which prioritized various ITS technologies; these priorities were mapped back to market packages.
- Project-Level Architecture. A more detailed architecture was developed for the early-winner project at Siskiyou Pass, in order to provide stakeholders with an understanding of how the National ITS Architecture could be used to support deployment.

The size and complexity of the COATS study area complicated how the architecture could be presented to stakeholders. Therefore, the Architecture Report (9) presents the COATS Architecture in three levels.

- A region-wide physical architecture, showing high-level interactions between different subsystems. This product had the advantage of being accessible to those familiar with the National ITS Architecture, but did lacked not have adequate detail at a sub-regional or local level to be of value to many local stakeholders.
- To improve accessibility to local stakeholders, the study area was divided into four subregions. Because the COATS project stresses connectivity between regions, architectural connections are provided between different subregions through statewide organizations, such as Caltrans, ODOT and the state police/highway patrol. The subregional architecture was presented by selecting individual systems from the larger regional architecture database and depicting all information flows to/from these systems. It was felt that this would be a useful diagram for stakeholders to review and modify the architecture as needed.

Appendix A – Case Studies

- A project-level architecture was developed for the early winner project.

It was agreed between project sponsors and research staff that the project budget was inadequate to develop a fully detailed, local-level architecture for the entire COATS study area. Consequently, the regional architecture uses placeholders to reduce the number of systems (such as using "Redding-Area Municipal Planning Agencies" to refer to dozens of cities' municipal planning agencies in the Redding vicinity). In addition, generic assumptions were made about interconnections between subsystems where information was inadequate. It was assumed that stakeholders would review the subsystem-level architectures before the architecture would be used to guide further deployment and design decisions.

Institutional Involvement

As is shown under the following section, the organizational structure of the project permitted stakeholders at many levels to get involved, depending upon their knowledge of regional issues and interest in the project.

The institutions most heavily involved in the project include the two state DOTs at several levels, including their statewide ITS divisions, their traffic management centers, and their maintenance districts. Other project partners included:

- Oregon State Police/California Highway Patrol
- Regional Tourism Agencies, including marketing organizations and managers of significant tourist destinations, such as National Parks
- Commercial Vehicle-Related Organizations (governmental and membership organizations)
- Transit Agencies
- County/Local Government Officials
- Private Sector Organizations, such as economic development organizations, fleet managers and casino operators

Other organizations have attended various outreach meetings and are included among the "Friends" of the project.

Organizational Issues

As shown in Exhibit 3 (presented at the end of this Case Study), the business plan (1) organized stakeholders into four primary groups.

- The Governing Board, an executive board, provides long-term direction and resolves politically sensitive issues
- The Steering Committee functions to provide a forum to decide program direction and focus, and to approve deliverables
- The Regional Teams' purpose is to provide an environment that will encourage ideas, outreach, and consensus to meet local needs and other Regional Team priorities
- Technical Task Forces provide an opportunity to address detailed technical issues, as required

Their roles, leadership, membership and meeting frequency are described in greater detail in Exhibit 4 (presented at the end of this Case Study). Together, these groups are arranged to emphasize the group's ability to meet its objectives and lessen administrative obstacles. Their

role is to create an atmosphere that will expand institutional linkages to reach consensus in developing ITS in Northern California and Southern Oregon.

A fifth group, a Coordinating Group, was formed well into the project, to assist in coordinating deployment efforts between the two state departments of transportation.

Outreach, Marketing & Education Activities

Much of the COATS project was directed toward outreach and education, because most stakeholders in the study area had little or no background with intelligent transportation systems. Some of the outreach and education activities include:

- Four outreach workshops held at the beginning of the project, which included an educational component and solicited input for the project
- Steering Committee meetings, held every two to three months, which were open to new stakeholders (although only members could vote) and were rotated among several cities around the study area to encourage broader regional participation
- Six architecture workshops, which also attracted new stakeholders to the project and therefore had an educational component
- A project brochure, which describes the study area, project objectives, and anticipated benefits
- A newsletter, Rural COATS Perspective, which updated those on the project mailing list of current COATS activities and the relationship of key stakeholders to the project
- A Web site (http://www.ruralits.org/projects/coats) that includes a description of the project scope, an archive of minutes and agendas from Steering Committee meetings, as well as links to project documents

Once the Strategic ITS Deployment Plan is approved by the Steering Committee, further outreach is anticipated to county and local planning organizations to promote additional regional support of the project.

Funding Opportunities and Sources

Initial project funding (State Planning and Research, Part 2, Pooled Funds) provided for the preparation of a Strategic ITS Deployment Plan and the research, demonstration and evaluation of an "early winner" project. This funding served as a catalyst for the two states to secure other funding for further rural ITS projects in the COATS study area. Other projects, called "Showcase" projects, have had funding secured through Caltrans and ODOT.

WTI is also collaborating in these Showcase projects through the U.S. Department of Transportation's Research and Special Programs Administration (RSPA) University Transportation Centers program. Their contribution of $1.6 million will go toward demonstration and evaluation of the Showcase projects.

Other Key Features

The COATS Strategic ITS Deployment Plan will include extensive research on operations and maintenance (O&M) considerations. While most ITS strategic plans include an estimate of O&M costs, little or no consideration is given to the institutional issues. This is especially critical in rural areas, where poor operations and maintenance practices may have significant safety consequences.

Current Status

The draft Strategic ITS Deployment Plan is currently being finalized. It is anticipated that the draft will be presented to the Steering Committee and Regional Teams for review by October 2000. Caltrans and ODOT staff will secure acceptance of the Plan from other organizations not formally a part of the Steering Committee. For example, in California, there are 11 Regional Transportation Planning Agencies responsible for transportation planning and programming activities within their county. Each agency will be individually consulted to secure acceptance of the plan.

The early winner project, centered around Siskiyou Pass Project on the Interstate 5 corridor between Medford, Oregon and Redding, California, will be in place before winter 2000-2001. Pre-deployment evaluation activities for this project are underway.

In California, parts of the other proposed projects are being funded by funds from the State of California as well as WTI (through the UTC program).

Future Activities Planned

The Strategic ITS Deployment Plan is intended to be a guidance document for ongoing ITS planning in the COATS region. Recognizing that ITS planning is dynamic, Caltrans and ODOT are expected to continue their efforts to ensure that the COATS Strategic ITS Deployment Plan is mainstreamed into state and regional transportation planning and programming.

The Showcase (demonstration and evaluation program) is expected to continue through June 2004. Showcase projects are being deployed in a manner consistent with the COATS project vision. They include a variety of technologies, such as closed-circuit television cameras, variable message signs, road and weather information systems, traffic detection stations, slide detection systems, and integration of field devices with satellite traffic operations centers. In addition, the evaluation of various ITS projects in the California portion of the COATS study area (in collaboration with Oregon) will be conducted.

Participating Institutions

Public:	California Department of Transportation (Caltrans) – project co-sponsor Oregon Department of Transportation (ODOT) – project co-sponsor California Association for Coordinated Transportation California Highway Patrol (CHP) California Trucking Association Federal Highway Administration (FHWA) Humboldt County Association of Governments Lassen County National Park Service Oregon State Police (OSP) Redwood Empire Association Rogue Valley Council of Governments Rogue Valley Transportation District Shasta-Cascade Wonderland Association Southern Oregon Visitors Association
Private:	Western Transportation Institute at Montana State University-Bozeman R.C. Ice and Associates (assisted with architecture development)

Cost Information

The total project cost is roughly $955,000, with 60 percent of funding coming from Caltrans and 40 percent of funding from ODOT.

Title	Date	Public Sector Cost	Contractor Cost
COATS Project	1998-2000	$121,400 (supports staff, Steering Committee and Regional Team travel)	$823,600

Of the project budget, $325,000 is allocated for design and deployment of the early-winner project. The budget allocated specifically for the preparation of the Strategic ITS Deployment Plan is $23,700. This amount reflects that significant work components covered in the Strategic ITS Deployment Plan were developed in other project tasks and summarized in earlier reports. The estimated costs of selected other project deliverables are as follows.

Project Task	Cost
Legacy Systems Report	$ 51,800
Conditions and Performance Report	$ 69,600
Traveler Needs Survey	$ 27,100
Stakeholder Outreach Summary	$ 16,900
Project Infrastructure Report	$ 47,500
Market Package Exercise	$ 3,800
Operations and Maintenance Document	$ 13,800
Regional Architecture	$ 60,000

Additional costs were borne by Caltrans and ODOT as project sponsors, and by organizations that participated in the Governing Board, Steering Committee and/or Regional Teams. The following table estimates the average amount of time spent per month on the project. (The amount of time fluctuated by month depending upon when deliverables were offered for review and when meetings were held.)

Level of Involvement	Cost
Caltrans Staff (per person)*	25-30 hours per week
ODOT Staff (per person)	20 hours per week
COATS Coordinating Group	15 hours per month
Steering Committee	10 hours per month
Regional Teams	2 hours per month
Governing Board	1 hours per month

?? - Caltrans has a higher time commitment since they served as lead state

Benefits

The COATS project, through Steering Committee meetings and other outreach efforts, has promoted increased inter-agency cooperation among regional stakeholders. As the Strategic ITS Deployment Plan is still under development, however, the benefits of its deployment cannot be adequately assessed.

Evaluation of deployed projects is a major focus of the COATS project. The Siskiyou Pass early winner is being evaluated, with results expected to be complete by June 2001. Showcase projects will also be evaluated after they are deployed.

Lessons Learned

- The Business Plan was a critical guidance document to direct the project and provide a framework for organizational interrelationships to be developed.
- Having a diverse mix of stakeholders, not only from state transportation agencies but also from tourism, emergency services, law enforcement and other organizations, is critical to getting a well-rounded assessment of rural needs.
- Developing a multi-modal focus for the region was difficult due to the multi-state nature of CVO systems and the fragmentary nature of the region's transit systems.
- Using quantifiable criteria for identifying regional challenges was analytically strong. However, the exercise of ranking several hundred locations for short, medium or long-term deployment of solutions proved to be a significant work burden for committee members.
- The development of the Regional Teams is critical to ensuring broad, regional buy-in to ITS initiatives.
- Rotating Steering Committee meetings throughout the study area was beneficial in ensuring that the project was not perceived as being focused on any particular part of the region.
- The regional architecture for such a large geographic area needs to be developed at a level of detail appropriate for the budget, understanding that further deployment efforts will need to enhance the base architecture.
- The terminology of the National ITS Architecture proved to be difficult for many stakeholders to grasp, so significant efforts had to be made to bridge that knowledge gap.

References and Contact Information

Note: Strategic ITS Deployment Plan is not yet available.

Documents Reviewed

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2. *California / Oregon Advanced Transportation Systems (COATS) Stakeholder Outreach Workshop Summary*. Western Transportation Institute, Bozeman [MT]: March 1999.
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7. Harry, Scott R., Randy W. Carroll and John M. Mounce, *Northern California / Southern Oregon Rural Intelligent Transportation Systems (ITS) Areawide Travel and Safety Improvement Project: Traveler Needs Survey (Volume I)*. Western Transportation Institute, Bozeman [MT]: September 1998.
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11. Carson, Jodi L., Scott R. Harry and Randy W. Carroll, "Understanding Traveler Perceptions Related to Northern California/Southern Oregon Corridor Challenges: A First Step in Deploying Advanced Traveler Information Systems in Rural Areas," *ITE Journal*, January 2000 (volume 70, number 1, January 2000, pp. 40-44.

Contact for further information

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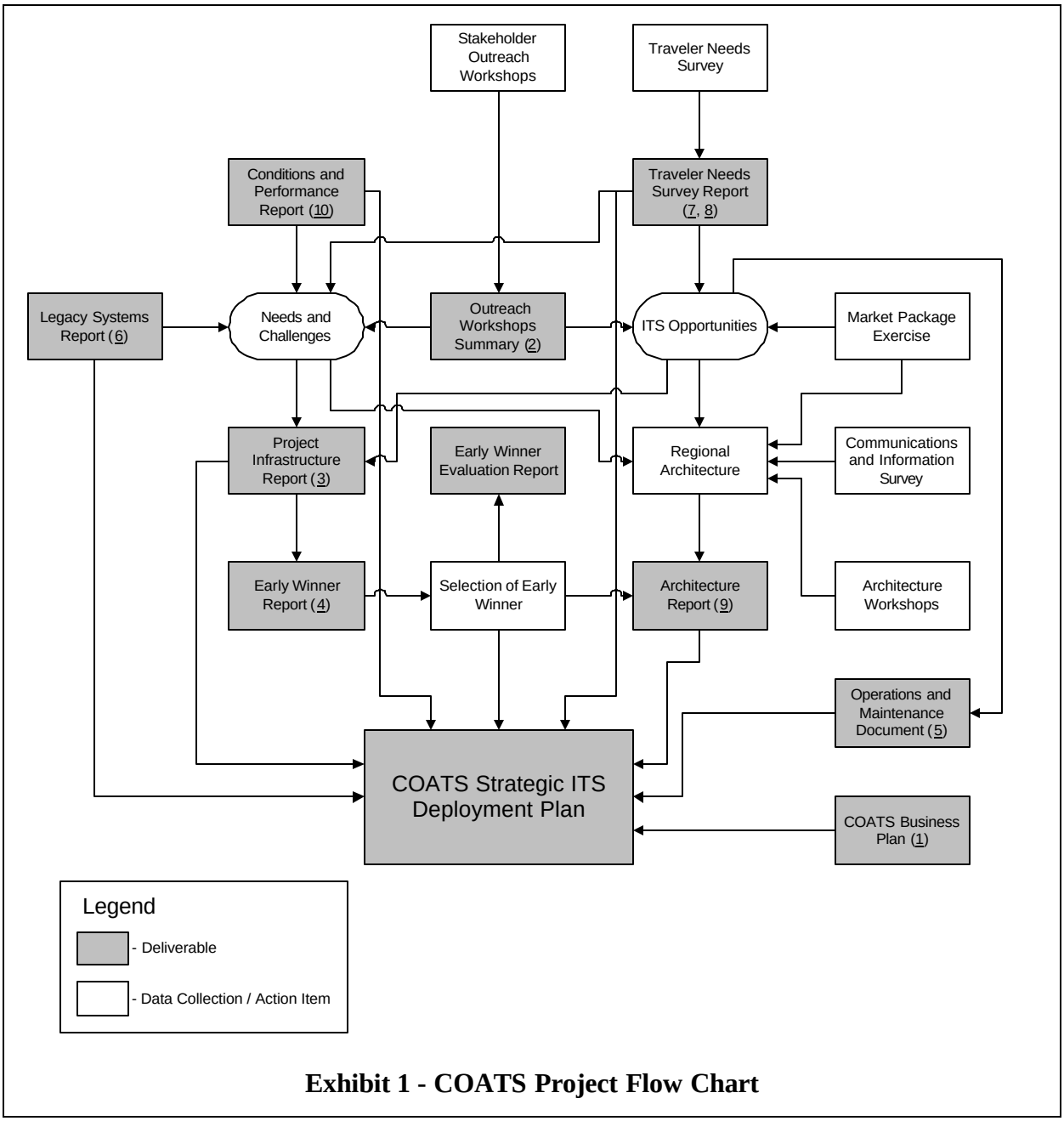

Exhibit 1 - COATS Project Flow Chart

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To view the COATS Internet web-site:

http://www.ruralits.org/projects/coats

Appendix A – Case Studies

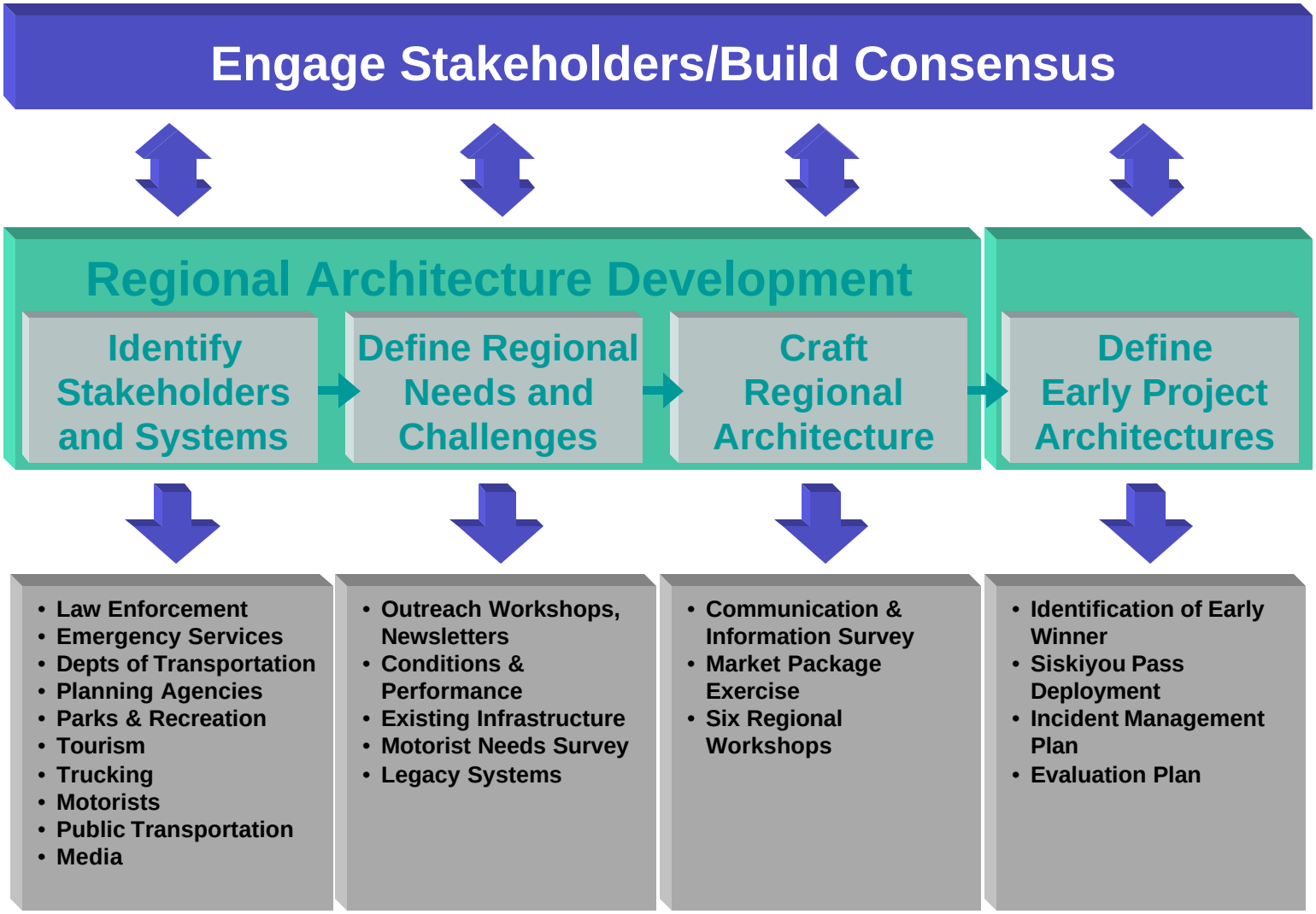

Exhibit 2 - Development of the COATS Regional Architecture

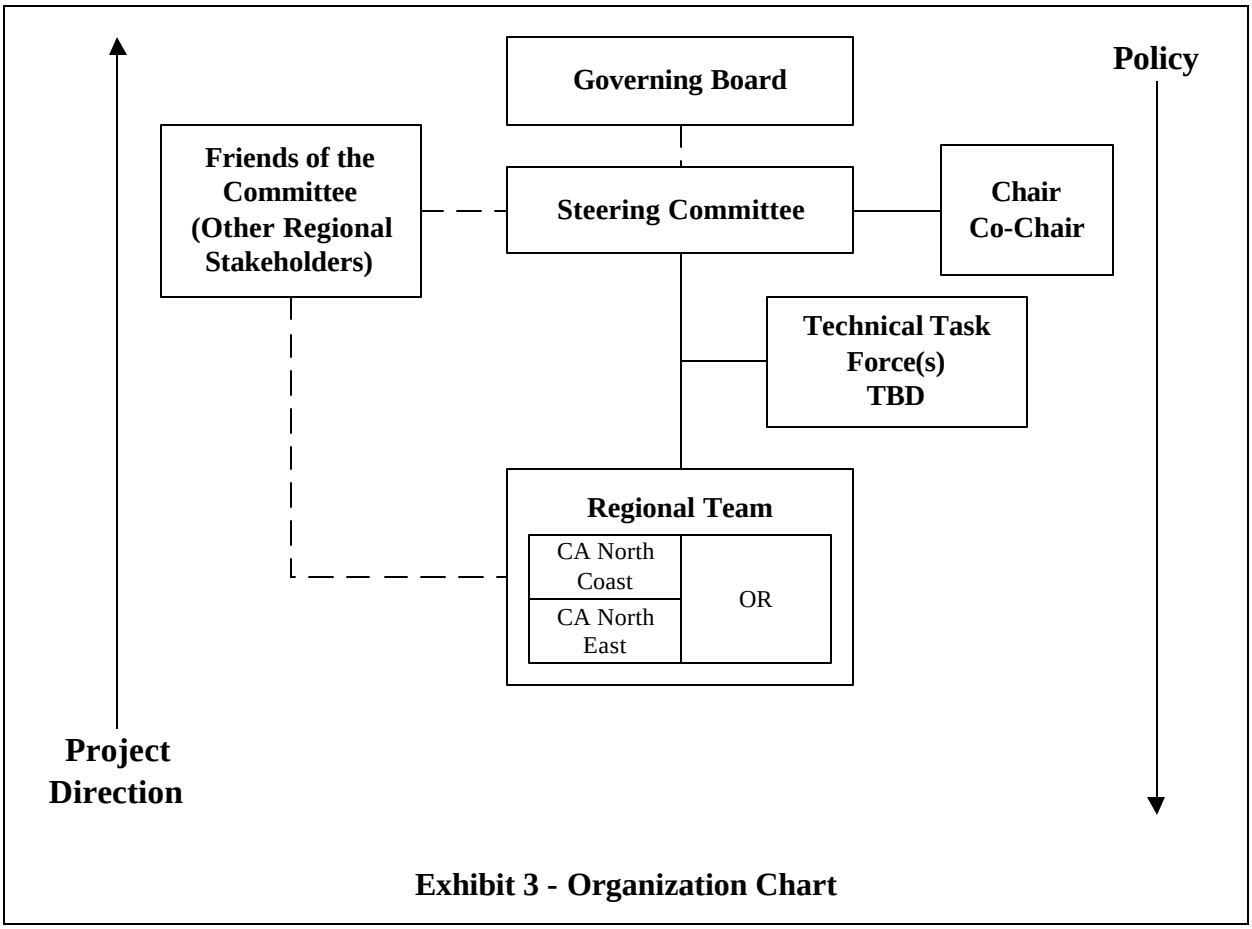

Exhibit 3 - Organization Chart

Organization	Role and Responsibility	Leader	Membership	Frequency of Meeting
Governing Board	Policy guidance on issues that exceed Steering Committee authority Issues relating to agency roles/responsibilities, funding sustainability, and politically sensitive matters	Governing Board Chairperson	FHWA Federal ITS Staff DOT planning staff, traffic operations managers and regional directors State police/highway patrol ITS America chapter presidents	4 – 6 months (or as needed)
Steering Committee	Provide strategic direction and oversight Review project progress Review project deliverables, including technical memoranda and reports Participate in project workshops Provide input and guidance to the Western Transportation Institute, MSU Ensure that available funds are programmed for short and long-term ITS demonstrations, operations, and maintenance Encourage community participation Review new technologies and concepts	Steering Committee Chairperson and Co-Chairperson from CA and OR Executive Director (liaison and contract manager) Co-Chairperson from CA and OR	FHWA District ITS Staff DOT ITS managers, district maintenance chiefs Regional Team representatives State police/highway patrol Commercial vehicle organizations Tourism organizations	Approx. every 2 months
Regional Teams	Build regional public/private stakeholder consensus Identify “friends of the committee” Assist with identifying regional needs Participate in workshops Advise Steering Committee	Caltrans, ODOT or WTI will facilitate	DOT district maintenance managers County/regional planners State police/highway patrol	As needed

Appendix A – Case Studies

Task Force(s)	Provide detail investigation on specific issues Potential area include but are not limited to Operations, Partnerships, Finance and Policy	TBD	Members of the Regional Teams	As needed
Coordinating Group	Discuss and coordinate project implementation Prepare recommendations for Steering Committee regarding integration and institutional issues	Caltrans or ODOT will facilitate	DOT staff WTI	Monthly

Exhibit 4 - Components of the COATS Organizational Structure.

Appendix A – Case Studies

Colorado ITS Strategic Work Plan

Goals

In recent years, Colorado has experienced record growth; this in turn has brought with it new challenges to the state's existing transportation system. The Colorado Department of Transportation (CDOT) developed its Intelligent Transportation Systems (ITS) *Strategic Work Plan* in an attempt to identify areas where ITS solutions could help address these new challenges and as a result, help improve efficiency and enhance capacity, safety and the overall quality of life.

The ITS Strategic Work Plan was intended to give direction to CDOT's efforts through its vision, its mission, its goals, and its objectives. At the highest level, the goals of the planning effort were to:

- Improve Safety
- Reduce Delay
- Increased Reliability
- Enhance Information for Mobility Options
- Reduce Environmental Impacts
- Increase Personal Empowerment
- Enhance Economic Benefit

From a more specific transportation point-of-view, the Strategic Work Plan also aimed to:

Reduce Congestion and Enhance Traveler Information

- Enhance the current ATMS system
- Develop Urban technologies that are compatible with the rural program
- Merge all available transportation operations and data within Denver and Colorado Springs
- Integrate the data and control of the two systems to provide operational support
- Develop the infrastructure that allows the transportation agencies and the private sector to deploy ATIS services.

Rural Areas

- Enhance the current ATMS systems and integrate into the CTMC or adjacent centers
- Enhance rural emergency response by providing real-time and accurate data
- Develop Rural technologies that provide accurate data and are cost effective
- Merge all available rural transportation data within CTMC
- Integrate the data and control into the CTMC to provide 24hr / 7day a week operational support
- Develop the infrastructure that allows the transportation agencies, commercial vehicle companies and private sector to deploy ATIS services in the rural area

Information Sharing

- Traveler information center
- Information dissemination and traveler services
- Information Collection

Commercial Vehicle Operations

- Weight in Motion
- CVO electronic credentialing (CVEC)

Approach

Rationale Behind the Project

The first ITS Strategic Plan for Colorado was completed in 1993 as part of the ENTERPRISE program. Through a series of workshops attended by predominantly CDOT personnel, user needs were established. These were subsequently matched up to potential ITS solutions. The Plan also developed an organizational structure (including the development of an IVHS/New Technologies Group) for the parts of CDOT responsible for ITS.

As one of the first statewide ITS planning activities, this Plan pre-dated much of the national guidance available to transportation professionals today. It also pre-dated the development of the national ITS architecture and its supporting documentation and concepts. Although it did include some deployment activities, the main focus of this Plan was placed on ITS as part of the research and development environment.

In 1998, recognizing the emergence of ITS solutions as part of the transportation mainstream, CDOT embarked on developing a new Statewide ITS Strategic Plan to provide a vision for ITS in Colorado into the 21st Century and to provide guidance for decisions on project selection and implementation. In addition to identifying transportation needs and proposing ITS solutions (as the earlier Strategic Plan had done), this planning effort also placed emphasis on:

- Increasing stakeholder buy-in to the planning process and to the recommended solutions
- A business-oriented approach to recommending projects
- A clear identification of fiscal constraints to ITS development and deployment
- Support for the incorporation of ITS projects into the Statewide Transportation Improvement Program (STIP)

Approach to Developing the Strategic Plans

In developing its Statewide ITS Strategic Plan, CDOT's ITS Office placed great emphasis on the involvement of stakeholders. In particular, the ITS Office identified CDOT Regions, the Municipal Planning Organizations and Transportation Planning Regions (TPR), the ITS industry, local municipalities, neighboring states, potential partners, and other users such as the motor carriers and the ski industry as key stakeholders who should be involved in the planning process. The development of the ITS Strategic Work plan was carried out by private sector consultants Parsons and Pat Noyes and Associates.

The participation of this broad cross-section of stakeholders state was also intended to ensure that the ITS planning process were coordinated and compatible with other statewide transportation planning efforts.

CDOT's ITS Office developed and distributed stakeholder information packets which included information on the Statewide ITS Planning Process, project request forms, time lines, for submittal of project request forms, guidelines for partnering and criteria for selection of ITS projects. After the completed project request forms were returned to the ITS Office, a Regional Forum for Project Discussion was held. Stakeholders outside of CDOT and partners in ITS, which include commercial vehicle operators, commuters, system owners, planners and managers at the federal state and local levels, were invited to the forum. Based on the results of this meeting, an initial project list was prepared by the ITS Office.

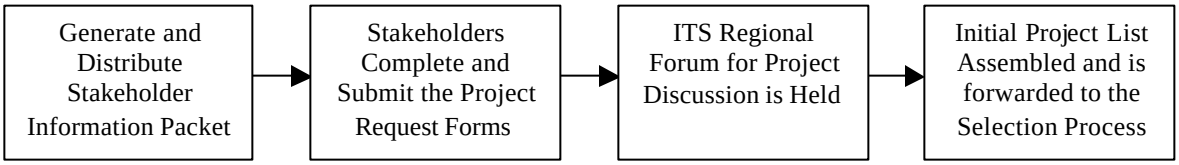

Exhibit 1 - The Outreach and Initial Development of the Statewide ITS Strategic Plan.

The selection of projects for inclusion in the Strategic Plan (the Selection Process in the last box in Exhibit 1) involved a series of review and consultation exercises involving CDOT's ITS Office and ITS Steering Committee. Using screening and evaluation criteria developed by the ITS Office and ITS Steering Committee, projects were prioritized on the basis of their alignment with Strategic Plan, its vision, its mission and its goals, and on their consistency with state and regional transportation plans amongst other criteria.

Exhibit 2 shows this selection process in more detail.

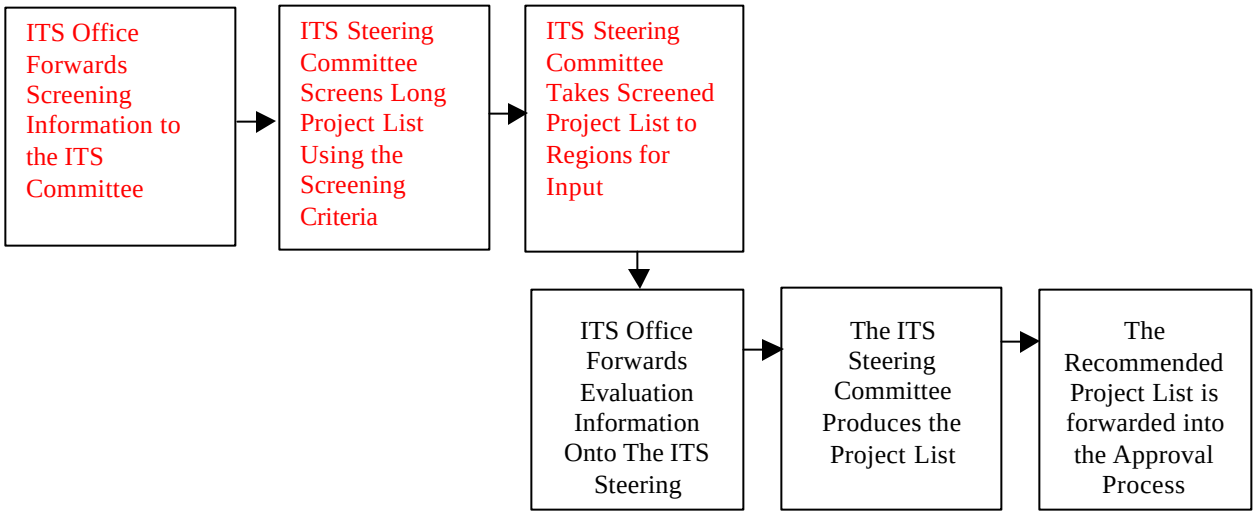

Exhibit 2 - The Selection Process

Appendix A – Case Studies

The process for approving projects was intended to explore funding opportunities and to take the final step toward the implementation of individual ITS projects and inclusion in the STIP and TIPs. Led by CDOT's ITS Office, this process explored funding opportunities such as federal funding, public /private partnerships, inclusion in regional construction projects, and local funding options.

The deliverables from the statewide planning process include:

- Development of the methodology for project selection and approval
- Formulation of the business plan

Using the results of the approval process, the ITS Steering Committee subsequently led the development of an ITS Business Plan. This consisted of two major elements:

- the recommended Project List
- an identification of fiscal constraints

This Business Plan identified ITS projects and identified how these projects were to be funded. Responsibility for approval of the ITS Business Plan lay with the Transportation Commission. The full Commission will be presented with the recommendation from the Colorado Transportation Management Center (CTMC). Subject to the Transportation Commissions approval of the Business Plan, its constituent projects would be forwarded for inclusion in the STIP. Exhibit 3 shows this approval process and the organizational structure of the three committees in greater detail.

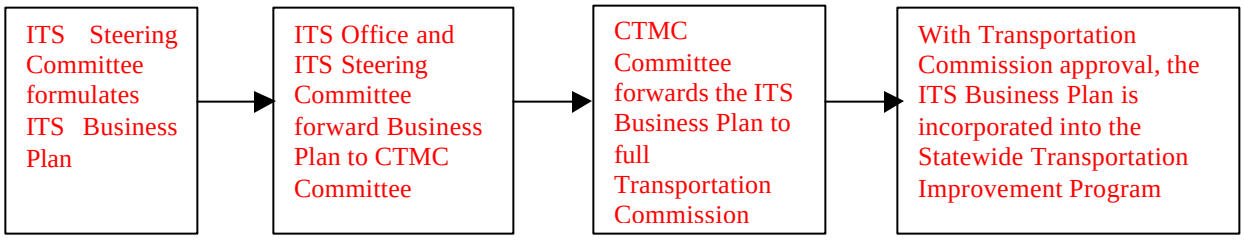

Exhibit 3 - The Approval Process of the Statewide Strategic ITS Plan

Contents

Projects and Activities:

The Statewide ITS Business Plan identifies the following list of projects and activities:

I. Congestion and Traveler Information

A: *Denver Metropolitan Area*

- Metropolitan area speed map
- Traffic Signal Interface
- Voice paging
- CCTV deployment

- RTD Transit Integration
- I-25 truck climbing lanes
- 1-800 Roadway information

B: *Colorado Springs*

- Metropolitan area speed map
- Denver and Colorado Springs Traffic Operations Center Integration
- Traffic signal interface
- Voice paging
- VMS deployment

II. Rural Areas

- All corridors equipped with state speed map
- Deployment of VMS in region 4 and 5
- Deployment of HAR on I-25 in region 4
- Auto traffic recorders on I-25 in region 4
- I-25 incident management (Denver Tech Center to Colorado Springs)

III. Information Sharing

- Traveler information center
- Information collection (25 CCTV cameras, fixed wing aircraft, mobile probes and radio scanner)
- Information dissemination and traveler services (TIC equipment hardware, cellular 211, traveler advisory telephone system, smart traveler, cable television studio, traveler website and ITS marketing)
- ATMS Expansion
- Internal and External Data Integration
- Low speed device communications link

IV. Commercial Vehicle Operations

- Weigh in motion
- CVO electronic credentialing (CVEC)

Architecture Issues

The Plan does not define an ITS Architecture for Colorado. The current *ITS Strategic Work Plan* will adhere to the National Architecture as part of both the development and deployment process. Solutions that address interoperability and communication issues on an intrastate and interstate level between systems will be developed using the National Architecture.

Institutional Involvement

The Plan recommends that partnerships be built between CDOT and other agencies (local, state, and federal) and between CDOT and private industry. Relationships such as this were seen as ways to expand the traditional limit of CDOT's service and funding to enhance service to the users and managers of transportation system. However, CDOT decided that it was not within the remit of the planning process to actually build these relationships.

The Plan also proposes that CDOT seek partnerships for sharing information such as:

- Exchanging road and weather data with other agencies
- sharing or integrating facilities with neighboring states
- leveraging infrastructure investments through shared resources such as communication networks
- developing alternative funding sources through facility leases or information access fees

CDOT initiated a strong partnership model with private sector agencies through the Revised Model Deployment Initiative (RMDI). The RMDI included an RFP for the design, build and maintenance of the Traffic Operations Center (TOC). CDOT solicited request from three private sector firms and has now laid the groundwork for public/private partnerships through the Colorado Transportation Management System (CTMS) effort.

CDOT is currently working with Odesta, who is developing CDOT's fiber optic networks.

Organizational Issues

The Plan identifies CDOT's ITS Office as being best place to take a strong leadership role in initiating and developing contacts with all stakeholders, developing partnerships including intergovernmental agreements and developing new methods for identifying legislative barriers, coordinating solutions and implementing new efforts to breakdown barriers. Based on this, an organizational structure was developed to ensure appropriate roles were assigned. These roles include:

ITS Office

- Project Tracking
- Development of Statewide and Inter-Regional ITS Projects
- Initiation of Outreach
- Leaders in Procedures
- Leaders in Legislative Change
- Champions of CVO
- Education of Stakeholders
- Statewide Integration of Projects and Project Development
- Liaison to the Regional and National ITS Efforts

ITS Steering Committee

- Development of Statewide ITS Protocols, Specifications, and Standards
- Individual Members are Liaisons with the CDOT Regions
- Providing and Acting on Feedback to Constantly Maintain a Customer Focused Process

CDOT Regions

- Tracking ITS Projects
- Development of ITS Projects
- Link to Stakeholders

Appendix A – Case Studies

Exhibit 4 is a map of Colorado's six regions which actively participate in the *Statewide ITS Planning Process*, by providing a communication link between the ITS Office, the ITS Steering Committee, the Regions and the Stakeholders.

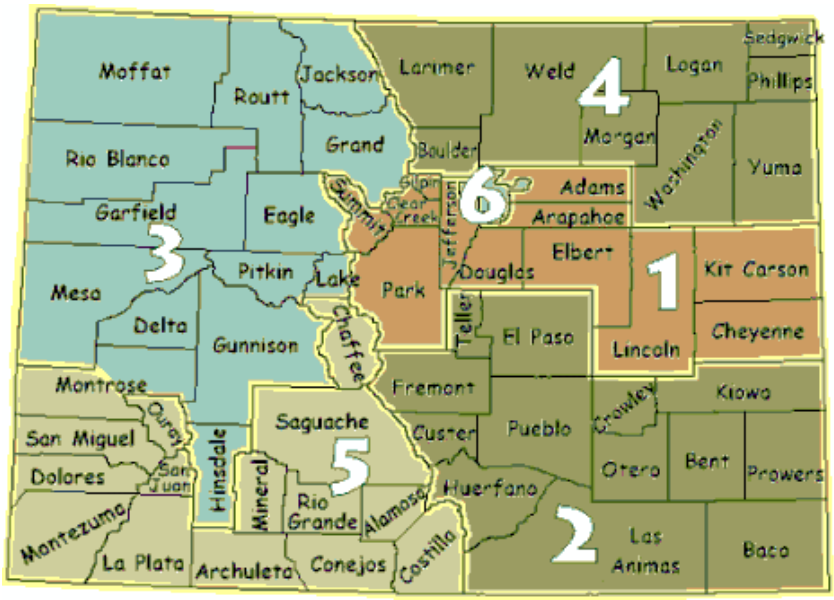

Exhibit 4 - Statewide ITS Planning Process Regions

Outreach, Marketing & Education Activities

To date, much of the outreach, education and marketing has been focused on soliciting stakeholder buy-in to the planning process and securing their approval of the resulting Strategic Plan. Much of this effort focused on the development of stakeholder information packets and on the meetings and Regional Forum for Project Discussion held in support of the project selection process.

The Strategic Plan also recommends that the ITS Office develop and implement a public relations program, a technology transfer program and a market analysis for educational and long term customer focus purposes

Other Key Features

Not Available

Funding Opportunities and Sources

The plan does not identify specific funding sources.

Appendix A – Case Studies

Current Status

It is recognized that projects identified as part of the Statewide ITS Planning Process have to be included in the STIP. Coordination with the preparation of the STIP is intended to occur as part of the ongoing Statewide ITS Planning and the maintenance of the ITS Business Plan. It has been recommended that in future years, the ITS planning process be merged with the development of the STIP process by including the outreach portion of the Statewide ITS Planning Process in the STIP process. In this way, it is anticipated that the TPRs will be encouraged to include future range ITS development needs in the regional planning process.

The ITS Strategic Work Plan is currently in the beginning stages of refinement and will be a continuation of the original plan. CDOT along with private consultant Dye Management are currently formulating working groups and developing strategies that will address a new series of statewide ITS needs. The development of the current strategic plan will remain consistent with the original outlined Vision, Mission and Goals. The plan is scheduled for completion in October 2002.

Top priority projects within the new *ITS Strategic Work Plan* include:

- Continued installation and development of fiber optic networks along I-70 westbound from Denver, I-25 north and south and state highway 160 from I-25 west to Alamosa as well as connecting several regional maintenance operation facilities
- Merge all available transportation operations and data within Denver and Colorado Springs
- Connecting existing systems with fiber optic to both the Denver Traffic Operations Center (TOC) and Traffic Management Center (TMC)

Future Activities Planned

Future plans include ensuring that ITS activities are included within the STIP following the process outline above.

A series of ITS Performance Measures have been developed to address the intended benefits of past and future Statewide Strategic ITS projects. The performance measures will address specific corridor and statewide projects and evaluate their effectiveness through a series of analytical ITS specifications.

Participating Institutions

The planning initiatives were led by CDOT and Parsons Transportation provided consulting services.

The following stakeholders were included in the development of the *ITS Strategic Work Plan*:

- Travelers
- Commercial Vehicle Operators
- Commuters
- System Owners
- Planners
- Managers at the federal, state, and local levels

Cost Information

Title	Date	Public Sector Cost	Private Sector Cost
ITS Strategic Work Plan	October 1998	Unknown	Unknown

Benefits

Direct benefits of the 1998 *ITS Strategic Work Plan* included:

- Education of those within CDOT on emerging uses and benefits of ITS programs
- Identified a broad perspective of statewide ITS projects

Lessons Learned

The importance of a common vision and strong leadership roles from the onset of the Strategic Work Plan has been emphasized by CDOT. Likewise, coordination of ideas within committees as well as between all participating agencies is essential for developing a common vision and a set of goals and objectives. Planners need to play a more significant role in the development of future strategic plans. Adherence the National ITS Architecture needs to be placed on the development of future plans. A greater level of outreach, marketing and education on the local level to inform regions on the full range of benefits ITS solutions. Furthermore, clear articulation of the needs and benefits the solutions will address and provide to policy makers will ensure future approval of ITS programs.

The importance of broad stakeholder participation has been emphasized by CDOT. CDOT found it important to maintain this involvement beyond the conclusion of the study, both through continuing meetings of the Steering Committees and by joint participation of agencies and organizations in the resulting design and deployment activities. Lastly CDOT will seek to incorporate ITS programs into new transportation projects in order to facilitate coordination among CDOT.

References and Contact Information

Documents reviewed

"C-Star Program – Strategic Plan for Intelligent Vehicle-Highway Systems in Colorado", Castle Rock Consultants, March 1993

"Colorado ITS Strategic Work Plan", Parsons Transportation, October 1993

Information regarding the status of Colorado's current transportation programs and projects will be available on a quarterly basis through www.cotrip.org.

Contact for further information

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Kansas Statewide ITS Plan

Goals

The Kansas Statewide ITS Plan is a strategy for the deployment of ITS technologies throughout the state of Kansas with the main focus being on rural applications. The state DOT (KDOT) has already started the deployment of several ITS technologies. KDOT identified five goals for this strategic plan, they are:

- Mainstream ITS into standard KDOT business procedures
- Integration of ITS technologies into the KDOT structure
- Increase the awareness of ITS opportunities and benefits educating KDOT personnel and the state public
- Identification of potential ITS projects and funding opportunities, especially for rural areas
- Set Priorities for ITS project areas

The main goal in the plan was integration of urban, rural, and CVO into one coordinated plan for the state. The goals in the plan were meant to be generic. They were determined such that no one would be left out of the ITS arena due to project scope. The State felt that the most important service they could provide to the rural communities was information for the traveler with easy and safe methods of obtaining the information. More specifically, the plan attempts to achieve these goals:

- Increase the operational efficiency of freeways, arterial roads and transit services by implementing optimized signal timing and coordination and improving incident management.
- Improve travel information regarding road conditions, construction work zones, detours and projects and make this information available in a variety of ways such as Variable Message Signs (VMS), Highway Advisory Radio (HAR), media outlets, hotlines, Kiosks and the Internet.

Approach

Rationale Behind the Strategic Plan

Kansas completed the plan to provide direction for the future of ITS and to eliminate possible "stovepipes" caused by other state agencies, other KDOT offices and communities not knowing what is being done elsewhere in the state. The driving force behind the plan was to manage the development of ITS in a coordinated manner.

Matt Volz, the State ITS Engineer and KDOT Management were responsible for moving this project forward.

Approach to Developing the Strategic Plan

The consultant's technical approach to the Kansas Statewide ITS Plan included the following activities:

- Assess ITS needs
- Identify transportation problems
- Determine traveler needs
- Inventory existing transportation projects

- Identity and solicit input from stakeholders
- Establish Statewide ITS goals
- Establish KDOT needs and goals
- Develop the Kansas ITS vision
- Develop Plan for Outreach and Mainstreaming Activities
- Identify ITS user services
- Develop Regional ITS Architecture
- Identify ITS projects
- Develop Strategic Plan. The plan will be evaluated for a period of two years until March 2002. Any revisions will be incorporated in final plan.
- Deployment of high priority projects

The above steps are graphically depicted in Exhibit 1 presented at the end of this Case Study.

Institutional/Organizational Approach

Work force was the driving force behind consultant use. The ITS Unit in Kansas was composed of two persons at that time and couldn't devote all their time to the Statewide ITS Plan. The ITS Unit and the Consultant Team combined worked as a team to complete the project. There were numerous team meetings during the development of the Statewide Plan. The team felt that this method was very necessary to complete the manner in a coordinated effort.

The steering committee is made up of KDOT, Kansas Highway Patrol, University Staff, and FHWA personnel. The steering committee meets quarterly and discusses ITS issues and updates of projects and programs. They are heavily represented in our local ITSA chapter and education opportunities provided by the FHWA Service Plan.

Contents

Projects & Activities

To help analyze and integrate the different Kansas ITS projects, the Statewide ITS plan grouped similar projects into program areas. A total of five program areas were identified:

1. **Priority Corridors** - This program area includes rural ITS projects that are being deployed on a specific corridor such as Interstate 70. Technologies that are being deployed or considered for deployment include Advanced Traveler Information Systems (ATIS), Weigh-In-Motion (WIM), and fiber optic communications. Other planned projects include VMS and HAR deployments.
2. **Commercial Vehicle Operations (CVO)** - An ITS/CVO business plan is currently under development in the State. This plan will define a CVO/ITS architecture as part of the FHWA sponsored Commercial Vehicle Information Systems and Networks (CVISN). The system architecture for the CVO program is anticipated to contain new deployments to the administrative center, roadside, and vehicle systems that will allow improved CVO processes. These improvements potentially include electronic credentialing, electronic data transfer, electronic roadside screening, and improved data record access.

3. **Maintenance** - Maintenance related ITS applications include projects such as Automatic Vehicle Location (AVL), Road/Weather Information Systems (RWIS) and others.
4. **Traffic Operations** - This program area focuses on ITS projects that are aimed at improving traffic operations in metropolitan and statewide areas. Two examples in this program area are the Wichita Traffic Operations Center and the Kansas City Scout Project.
5. **Rural Safety and Mobility** - This program focuses on all safety-related projects that have a bearing on the rural traveler as well as rural transit. Work zone applications, Automatic Collision Notification (ACN) and Mayday Systems are few examples in this program area.

With regard to the Telecommunications infrastructure and, the plan included the following activities:

- ✍ Conform to ITS communications standards
- ✍ Make efficient use of the fiber optic resources and the 800 MHz radio network
- ✍ Interconnect the fiber network with the microwave network where feasible
- ✍ Expand the optical fiber backbone throughout Kansas
- ✍ Create a telecommunications unit within KDOT

Architecture Issues

The Kansas Statewide ITS architecture will tie each of the identified program areas together in a way that will ensure an interoperable statewide ITS system. This architecture is consistent with the National ITS Architecture and will include existing and future ITS implementations.

In addition to the subsystems and agencies that are a part of the Kansas Statewide ITS Architecture, there are also a number of external interfaces including other states, local agencies, media, emergency personnel, rail operators and metropolitan planning organizations. Exhibit 2 shows a high-level depiction of the Kansas Physical ITS Architecture (presented at the end of this Case Study).

Regarding the use of the ITS Architecture and the Telecommunication Infrastructure, the Statewide plan suggests the following implementation strategies:

- ✍ Evaluate how future projects fit into the Statewide ITS Architecture
- ✍ Establish a schedule for periodically reviewing and updating the ITS Architecture

Institutional Involvement

The Kansas Statewide ITS Plan was developed by a group of participating institutions representing the public sector, private sector and academia.

From the public sector, the following were involved: personnel from the state's six Districts offices, Bureau of Design, Bureau of Traffic Engineering, Bureau of Transportation Planning, Bureau of Construction and Maintenance, Bureau of Program Management, Bureau of Computer Services, City and county public officials, Transit and paratransit providers, EMS/Law enforcement, and Farming and business interests

Public-private opportunities have been discussed for each of the six program areas identified in statewide plan. The level of involvement of the private sector ranges from limited as in the case

of the Maintenance Program Area to extensive as in providing wireless communication services to remote areas as described in the program area for Rural Safety and Mobility.

The University of Kansas through the active involvement of Dr. Eric Meyer, has participated in the development of the Statewide plan.

Organizational Issues

Integrating or mainstreaming ITS into the KDOT business process is key to the successful deployment of ITS programs in the State of Kansas. In order to achieve that, funding, contracting, planning, design, operations and maintenance of ITS projects needs to be addressed in all bureaus of KDOT. The following key recommendations were made:

- Continue to strengthen the role of the KDOT ITS Steering Committee, which is responsible for providing guidance, suggestions and feedback
- Promote interagency coordination by establishing informal working groups that consist of representatives from each of the agencies involved. The CVO Executive Working Group, which is comprised of KDOT, Kansas Department of Revenue (KDOR), Kansas Corporation Commission (KCC), FMCSA, Kansas Highway Patrol (KHP) and Kansas Motor Carrier Association (KMCA), is a current example of this kind of interagency coordination
- Contact other states to solicit ITS standards and detail sheets if they are available
- Develop checklists for projects and bureaus to help identify potential ITS elements in KDOT projects
- Integrate rural and urban ITS programs. These two areas of ITS are often treated independently with the urban programs focusing on reducing traffic congestion while the rural programs are focusing on improving safety. Potential strategies for integrating the two include:
    - Establish informal working groups to facilitate coordination between the two programs
    - Develop a statewide operations center

Examples of sponsoring agencies include the Department of Commerce and Housing which subscribed to the DTN kiosks at two welcome centers in Kansas. These kiosks provide weather information to the traveling public that stops at the welcome centers. Another sponsor is the Kansas Highway Patrol that has AVL systems installed in their patrol cars in the northeast part of the state and wants to expand to cover the whole state.

Outreach, Marketing, & Education Activities

In the process of developing the Kansas Statewide ITS Plan, two rounds of ITS awareness seminars were held in each KDOT district and at headquarters. Among the attendees of these seminars were KDOT and Federal (FHWA) personnel; city and county public works officials; transit and Para transit providers; EMS/law enforcement; and farming and business interests. Following each seminar, the attendees were then encouraged to share their thoughts on ITS in general and to discuss ITS applications specific to their field of work in particular.

In addition to the awareness seminars, the plan made several recommendations to help in the marketing and outreach efforts in the State of Kansas, among these recommendations are the following:

- Designate ITS "champions" in the different KDOT bureaus to help facilitate the mainstreaming of ITS into their work area
- Identify and encourage the rapid deployment of ITS projects that have a high potential for providing substantial benefits or projects with a high-level of visibility to the traveling public
- Conduct various internal and external publicity campaigns to promote the advantages of these projects
- Develop a continuing process of education for KDOT personnel
- Obtain buy-in from the ITS Steering Committee on important decisions relating to ITS

Funding Opportunities and Sources

Due to the nature and size of ITS deployment projects, funding is a crucial factor in planning; prioritizing and deploying selected ITS application. The Kansas Statewide ITS Plan identified a number of potential sources for funding:

- Existing funding sources from Kansas Department of Transportation (KDOT funding category)
- ITS Set-Aside Funds (KDOT funding category)
- Federal and State Research Funds
- Other Funding Strategies

Other Key Features

State-to-State Coordination -A key issue considered in the development of the Kansas Statewide ITS Plan was the value of cooperation and coordination with other states. Significant benefits can be achieved by forming multi-state alliances for the deployment and operation of ITS. Consistency and integration across state lines is critical for some applications, particularly commercial vehicle applications and Advanced Traveler Information Systems (ATIS).

Traffic Management System in Kansas City (Scout) -Currently, there is a bi-state partnership between Kansas and Missouri to develop a shared Traffic Management System (TMS) called Scout. The Traffic Operations Center (TOC) building will be located in Lee's Summit, Missouri, and will be operated and maintained by MoDOT personnel. It will be used to monitor and manage traffic conditions on freeways in both Missouri and Kansas.

ITS Heartland - ITS Heartland is a regional chapter of ITS America that is made up of the states Kansas, Missouri, Iowa and Nebraska. The purpose of this organization is to increase interregional coordination between the member states on ITS-projects and research. This includes conducting pooled fund studies, sharing ITS data, and ensuring interoperability between ITS systems.

Current Status

The Kansas Statewide ITS Plan was completed on March 2000. However, this plan is a living document for at least two years from the date it was published. The state DOT (KDOT) has already started the deployment of several ITS technologies. The status of the top five systems being implemented in the state is summarized below:

1. The Kansas City Scout is in the final plan stage and is scheduled to be let in June 2001. The project will take 24 months to construct and it is a coordinated effort between KDOT and MoDOT.
2. The Wichita ATMS is still in the beginning stages. Money has been allocated by KDOT to get the project started and currently is waiting on commitment by the City and County.
3. The Statewide Fiber Optic network is just about complete. Kansas will have approximately 700 miles of fiber when the system is complete. It is a private/public partnership that will provide the backbone for our ITS within the state.
4. The CVISN plan is complete and Kansas is currently working to become Level 1 compliant.
5. On the transit side, Kansas is currently working toward obtaining a Project Manager to study, design, deploy and train two rural transit providers for and integrated AVL/CAD system. The state hopes that all rural providers can eventually use this system statewide.

The plan has been reviewed and approved by the DOT Program Review Committee. It has been reviewed by counties, cities, and MPO's throughout the state.

Future Activities Planned

1. Establishing a periodical review process of proposed ITS projects to:
   - ✍ Identify potential cost sharing opportunities and minimize unnecessary system redundancies
   - ✍ Identify potential data sharing opportunities
   - ✍ Maintain the project database
2. Updating the Statewide ITS Architecture and the Statewide ITS Plan
3. Encouraging the coordination of efforts within KDOT and with neighboring states. To help accomplish this coordination, ITS deployments should be evaluated and finding disseminated through outreach campaigns.
4. Identifying and developing design standards and guidelines for agencies and individuals considering ITS deployments in Kansas.
5. Staffing needs and training requirements:
   - ✍ Continue the role of the ITS Steering Committee
   - ✍ Consider hiring additional staff trained to operate, administer, manage, and provide the ITS field devices or the optical fiber backbone
   - ✍ Train staff that will be involved with ITS deployment and operation
6. Evaluating the progress in the state two years after the Kansas Statewide ITS Plan was published. The evaluation period will last three months starting on March 2002. The entire team responsible for putting together the initial plan will participate in the evaluation process.

Participating Institutions

Public:	Federal Highway Administration (FHWA) Personnel from the State's Six Districts Bureau of Design Bureau of Traffic Engineering Bureau of Transportation Planning Bureau of Construction and Maintenance Bureau of Program Management Bureau of Computer Services City and county public officials Transit and paratransit providers EMS/Law enforcement Farming and business interests
Private:	TranSystems Corporation Sparling Corporation Cambridge Systematics Jane Mobley Associates with eTc Institute
Academic:	Dr. Eric Meyer, University of Kansas

Cost Information

The cost to complete the plan along with a 2-year evaluation period was $447,882. KDOT staff put in approximately 15 to 16 hours per week.

Benefits & Lessons Learned

The Kansas Statewide ITS Plan is a living document. The team responsible for putting together the plan will be monitoring any ITS project deployments in the State, maintaining and updating the project database and evaluating the benefits.

This close monitoring will last for two years after which, the team will meet again in March 2002 to revise and update the Statewide ITS Plan. This evaluation is needed to justify the funding that was dedicated to the project. These evaluations will be used for future projects. As future revisions of the statewide plan are released, the realized benefits to date will be added for reference.

Some potential benefits include:

- In the area of commercial vehicles, the benefits include improved speed and safety of goods movement
- In the area of maintenance operations, benefits include a more efficient management of resources and labor, the elimination of redundant processes and improved roadway safety and travel conditions
- The deployment of Traffic Operations Centers (TOC) will help reduce the incremental costs of adding new components
- Reduced emergency response time when accidents occur

References and Contact Information

Documents reviewed

Report Summary, Kansas Statewide ITS Plan (March, 2000)

Contacts for further information

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http://www.ink.org/public/kdot/

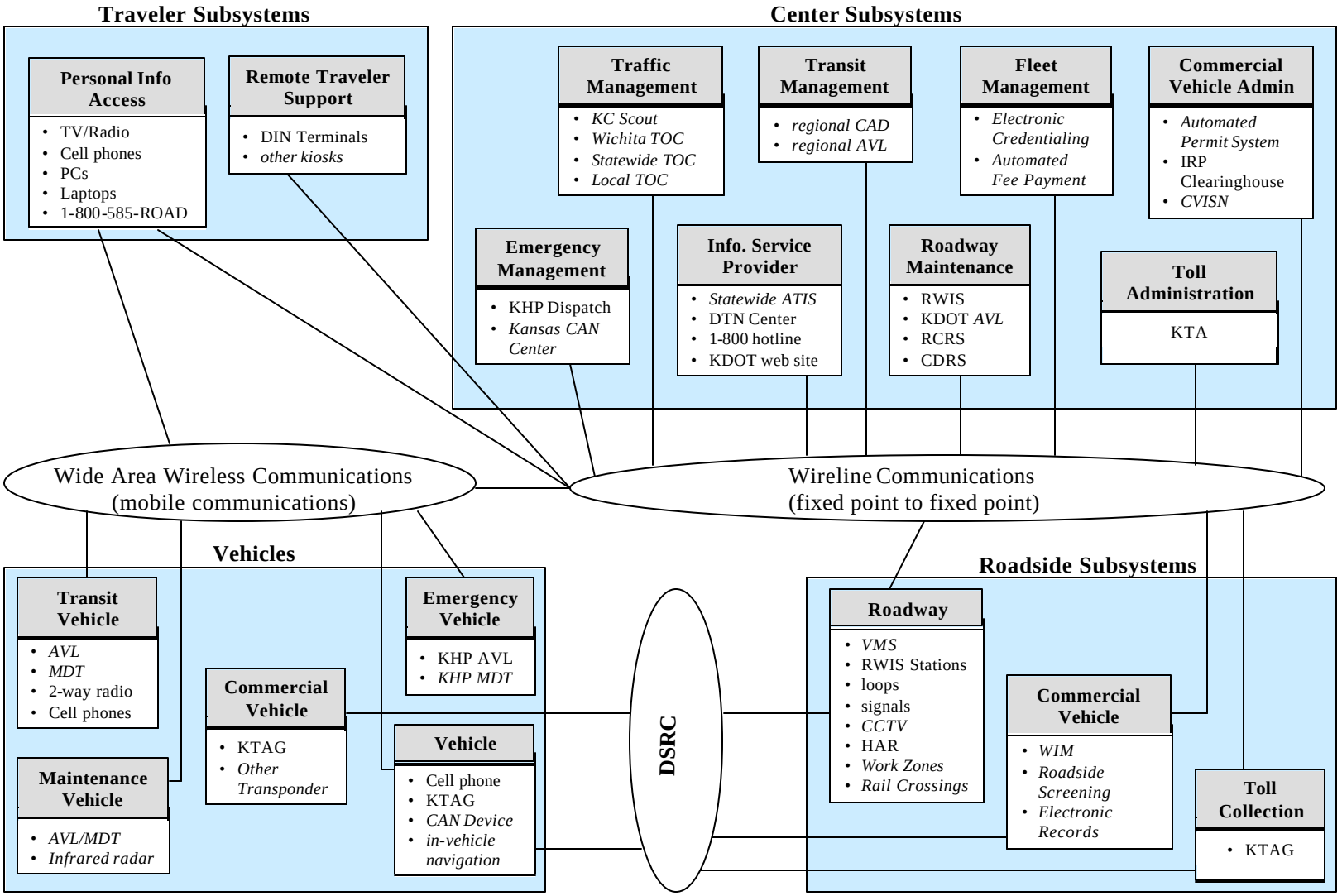

Exhibit 1 – Kansas Statewide ITS Plan Technical Approach

Appendix A – Case Studies

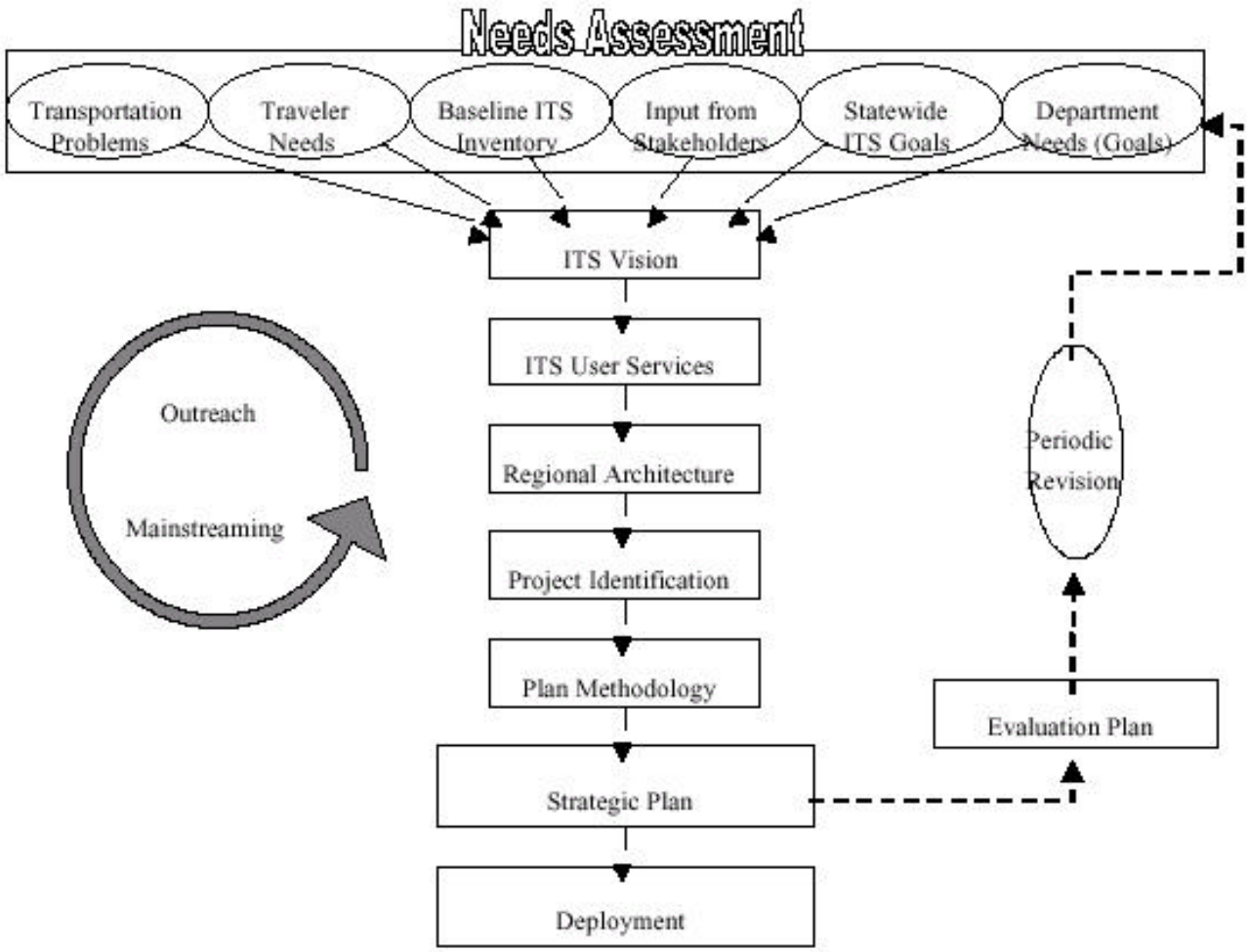

Exhibit 2 – Kansas Statewide ITS Physical Architecture

Appendix A – Case Studies

Minnesota Guidestar - Statewide ITS Planning

Goals

Minnesota is recognized as one of the pioneering states in ITS and as part of maintaining this leadership role, stakeholders place a significant emphasis on planning and coordinating ITS initiatives throughout the State. To date, much of this work has been carried out under the umbrella of Minnesota Guidestar; the State's ITS research, testing and deployment program. Its overall objective is to use advanced technologies to save lives, time and money. Today, its specific objectives are:

- Expand ITS outreach and education efforts
- Facilitate innovative partnerships
- Provide strategic direction to policy-making bodies
- Mainstream ITS into the statewide transportation planning and implementation process
- Promote conformance with the state and national architecture, standards and protocols

Approach

Minnesota Guidestar was established to direct the State's public, private and academic efforts in ITS and partly in response to the 1991 Federal Intermodal Surface Transportation Efficiency Act (ISTEA). Since its establishment, a series of plans reflecting research, testing and the deployment of ITS on a statewide basis have been prepared. These include the:

- Minnesota Guidestar Strategic Plan (1992)[1]
- Minnesota Guidestar Rural Scoping Study (1994)[2]
- Polaris Statewide Architecture Project (1995)[3]
- Minnesota Guidestar Statewide Business Plan for Commercial Vehicle Operations (CVO) (1995)[4]
- Minnesota Guidestar NOVA Strategic Plan (1997)[5]
- Minnesota Guidestar Board of Directors' Statewide ITS Strategic Plan 2000[6]

Rationale behind the Strategic Plans

Minnesota Guidestar's first Strategic Plan prepared in 1992 acted as a basis on which the various ITS projects starting to emerge from different parts of Mn/DOT, from the private sector and from the University of Minnesota could be coordinated and managed. It focused primarily on urban applications of ITS, building on Mn/DOT's strengths in traffic management and traveler information, particularly in the Twin Cities metropolitan area. It also marked the elevation of Minnesota Guidestar to the status of a separate Office within Mn/DOT[1].

Recognizing the 1992 Plan's focus on urban transportation, the 1994 Rural Scoping Study focused on the needs of travelers in rural parts of the state and proposed potential ITS solutions to address these needs[2]. Further recognizing the need to unify the State's urban and rural ITS planning activities, Mn/DOT's 1995 Polaris Statewide Architecture Project could be argued to be Minnesota's first truly statewide ITS planning initiative. Drawing on input from state agencies who provided ITS-related services, it defined a high-level architecture within which existing,

emerging and future ITS components throughout the state could be interrelated on a common basis[3].

In 1994, a new CVO section within Minnesota Guidestar was charged with expanding the contents of the 1992 Strategic Plan to identify a more defined course of action for CVO in the state. As a result of extensive consultations with state agencies and the motor carrier community, the CVO section prepared the Minnesota Guidestar Statewide Business Plan for CVO. This recommended the re-engineering of CVO-related processes to improve commercial vehicle regulation in the state[4].

The current Strategic Plan (Strategic Plan 2000) guides the continued implementation of what is now an integrated statewide program of ITS. Unlike previous Strategic Plans, which typically solicited stakeholders views through a series of workshops, Strategic Plan 2000 was developed by and therefore primarily reflects the Minnesota Guidestar's Board of Directors' direction for future ITS deployments. This change in direction was based on the emergence of the Board of Directors as a body to develop consensus among public, private and academic sector stakeholders at a senior management level and which set strategic directions for ITS in the State. Although primarily intended for the Board's use, it is also intended to be used by the broader ITS community within the state[6].

Approach to developing the Strategic Plans

The development of Minnesota Guidestar strategic plans is typically initiated by soliciting input from stakeholders around the state. For example, as part of developing the program's initial Strategic Plan (1992)[1], a series of stakeholder workshops were held, each workshop bringing together stakeholders from similar backgrounds to identify and discuss their needs. As shown in Exhibit 1, based on initial work conducted by Mn/DOT's support consultants, each workshop began by introducing stakeholders to the potential offered by ITS technology. With this as background, stakeholders were invited to discuss their own specific needs; after the workshops, technologies to help address each of these needs were identified and a draft Strategic Plan prepared. As this process pre-dated any national ITS planning guidelines, it was based entirely on state-specific requirements and information.

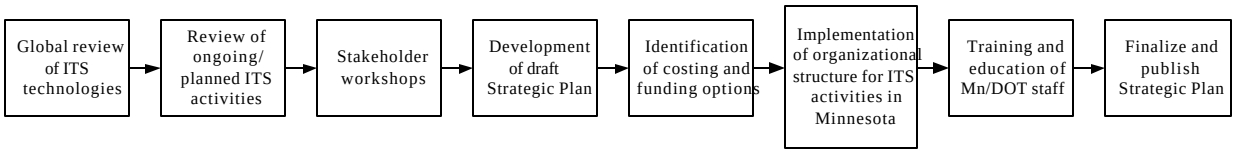

Exhibit 1 - Approach to developing 1992 Minnesota Guidestar Strategic Plan

The NOVA Strategic Plan[5] was based on ITS user services which by 1997, had been agreed nationally. As shown in Exhibit 2, needs and requirements were developed as a result of a two-day workshop attended by 162 people from around the state. Using consultant support, other successful ITS deployment activities from around the U.S. were examined in order to identify ITS solutions which could potentially be transferred to Minnesota. The needs and requirements were translated into ITS user services and matched with the potential ITS solutions. As a result, a Strategic Plan was developed. Using the Plan as a basis, Mn/DOT solicited project proposals from its Districts, the solicitation requiring that each proposing District contributed funds and/or resources.

Appendix A – Case Studies

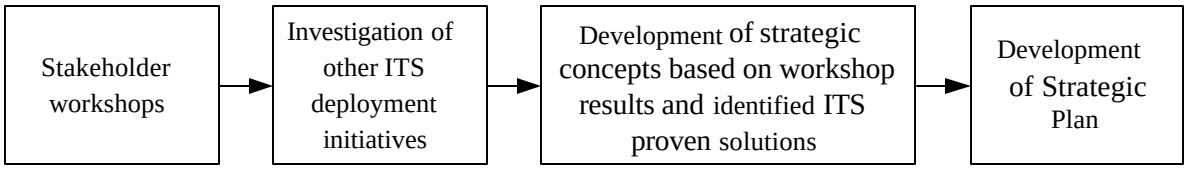

Exhibit 2 - Approach to developing 1997 Minnesota Guidestar NOVA Strategic Plan

By contrast, the current Strategic Plan (2000)[6] was primarily on the results of a Board of Directors' retreat conducted in 1999. As shown in Exhibit 3, it also drew input from the other Minnesota Guidestar committees and from other key stakeholders. As with the previous Strategic Plans, it was developed with consultant support.

Exhibit 3 - Approach to developing 2000 Minnesota Guidestar NOVA Strategic Plan

Contents

To be of most use to readers, this "Contents" section draws information from all of the above sources. However, the majority of information is drawn from the current strategic plan, the Minnesota Guidestar Board of Directors' Statewide ITS Strategic Plan 2000[6].

Projects and Activities

The current Strategic Plan 2000[6] includes the following activities:

ATMS and ATIS

- Designing and implementing a statewide communications infrastructure based in part on fiber optics, 800 MHz communications, microwave and infrared
- Implementing a statewide advanced traveler information systems
- Deploying a Regional Traffic Management Center in the Twin Cities Metro Area and continuing its program of deploying Transportation Operation and Communications Centers across the statewide
- Completing the deployment of its ORION model deployment initiative in the Twin Cities
- Implementing ITS technologies (such as CCTV, VMS and advisory speed limits) on interregional corridors

Intelligent Vehicle Initiative

- Deploying systems such as the Smart Plow

Transit-Related

- Expanding public transit system support (including AVL/GPS, trip reservations, computer-aided dispatch and emergency response) across the state

CVO

- Continuing to implement the plan for CVISN in Minnesota

Appendix A – Case Studies

Other Related Activities

- Improving infrastructure safety, management and operations such as snowplows, bridge de-icers, flood warning systems, etc.
- Increasing awareness of new technology (such as head-up displays, auditory signals, etc) aimed at assisting drivers

Architecture Issues

The architecture developed as part of the Polaris project was designed to unify the growing number of application- or project-specific ITS architectures that had been developed in the state. As shown in Exhibit 4, it was based on a analyzing market research data gathered from Minnesota travelers across the state and from institutional stakeholders through a series of focus groups and telephone surveys. This data was used to identify the most important transportation needs, service requirements, and levels of satisfaction with the current transportation system[3].

This state-specific data was translated into the context of the national ITS user services; the relevant national user services were subsequently translated into eleven Minnesota-specific user services that the ITS architecture would have to provide. The ITS components necessary to support these state-specific user services were then defined followed by their constituent functions and sub-functions and the flows of data between them. This provided the basis for the functional architecture.

The physical architecture was developed using the existing architecture as a basis. Existing architecture components were identified and analyzed in order to define their exact roles and to identify the data exchanged with other components. A series of candidate future physical architectures (ie introducing the components necessary to provide the state-specific user services into the existing physical architecture) were defined and reviewed by a series of working teams. These comprised agencies responsible for providing each of the services in question. Through a comprehensive analysis trading-off advantages and disadvantages of each candidate architecture, the optimal architecture for Minnesota was selected. System requirements and data flows were subsequently allocated to each of the components in the selected architecture. This acted as a basis for defining all component interfaces and requirements for the Minnesota ITS architecture.

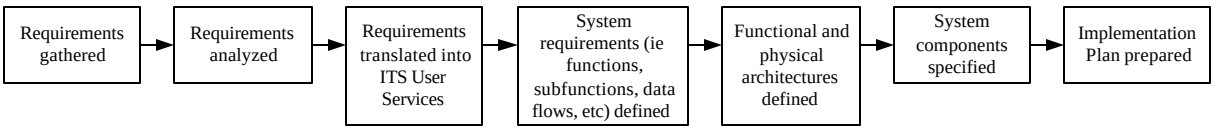

Exhibit 4 - Approach To Developing Statewide ITS Architecture As Part Of Polaris Project

Deliverables prepared as part of the Polaris study were:

- Minnesota Traveler Wants and Needs - documents the transportation wants and needs information collected from Minnesota residents during ten focus groups held across the state
- Minnesota Transportation Agency Wants and Needs - documents the transportation wants and needs information collected from Minnesota stakeholder agencies during seven agency group discussions held across the state
- ITS Architecture Wants and Needs - uses the previous wants and needs documents to establish, prioritize and document national ITS user services and consequently, the Minnesota-specific user services

Appendix A – Case Studies

- Statewide ITS As-Is Agency Reports for Minnesota - describes the existing transportation systems and the existing physical architecture
- ITS System Specification - identifies functions, interfaces and requirements associated with the Minnesota-specific user services and Components
- ITS Components Specification - identifies physical interface and requirements allocation for each Minnesota ITS component

It should be noted that Polaris pre-dated the finalization of the National ITS Architecture. However, recent, urban-oriented architecture activities are compliant with the National Architecture and there are firm plans for the migration of Minnesota's remaining ITS architectures (including the statewide architecture) towards compliance through the use of ITS standards (see Future Activities Planned).

Institutional Involvement

Minnesota Guidestar is based on the active participation of the public sector, the private sector and academia. Originally focusing on the needs of travelers and public agencies in the Twin Cities metropolitan area, the program has been increasingly successfully in bringing different offices in Mn/DOT and cities and counties from around the state together to further the development of ITS in Minnesota.

Participation of the private sector has been solicited though traditional RFPs and through more innovative mechanisms such as public-private partnerships where the private sector partner is expected to contribute to the cost of the project and to share some of the risk.

Academia in the form of The University of Minnesota plays a key role in identifying critical issues in transportation and using multidisciplinary approaches to identify the potential for ITS to address them.

Recognizing the diverse organizations now involved in the Program, the Strategic Plan includes a series of action items designed to ensure their active participation and ultimately, their buy-in to the Program's goals, objectives and initiatives. These action items include:

- Overcoming the general lack of knowledge regarding ITS benefits to its main constituencies - the public, customers within agencies, legislators and policy makers for example
- Overcoming institutional barriers to communication and cooperation between and within public institutions
- Overcoming public/private sector cultural differences
- Expediting the transfer of research results into practical applications

Organizational Issues

The program's original organizational structure as described in the 1992 Strategic Plan was defined to maximize participation from both the public and private sectors and from academia.

The organizational structure and the mechanisms to continue this broad-based participation have evolved as the program has developed.

The current organizational structure shown in Exhibit 5, comprises:

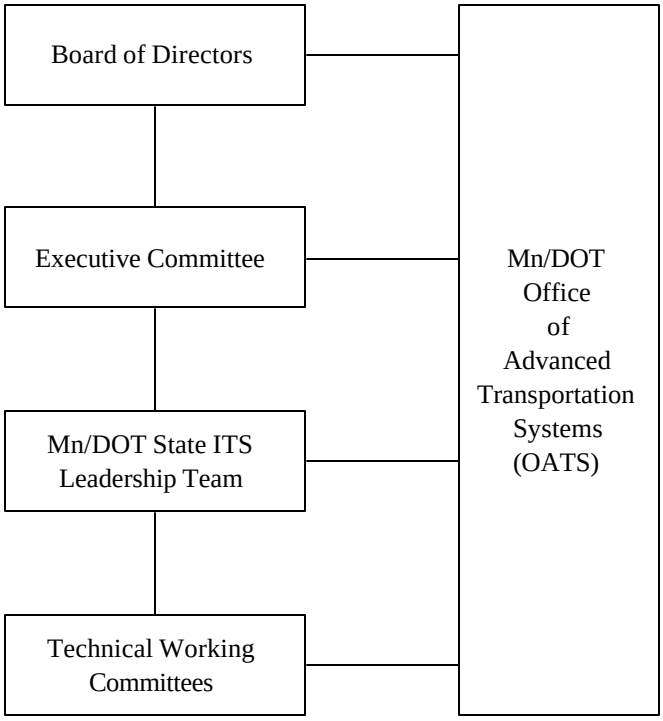

Exhibit 5 - Current Organizational Structure

- **The Board of Directors** - Includes officers from both public and private sector organizations with representatives from the general public, it serves to develop consensus among stakeholders at a senior management level
- **The Executive Committee** - Reports ideas and initiatives to the Board of Directors and functions on its behalf between the Board's quarterly meetings
- **Mn/DOT's State ITS Leadership Team** - Coordinates public sector activities and resources, establishes business objectives and monitors progress toward those objectives though project and program initiatives
- **Technical Working Committees** - Composed of project teams which monitor and coordinate the day-to-day operations of the individual projects
- **Mn/DOT Office of Advanced Transportation Systems** - Manages the Minnesota Guidestar program and provides administrative support to the committees

Outreach, Marketing & Education Activities

Minnesota Guidestar is renowned for its outreach, marketing and education activities. These have included:

- Hosting of forums geared toward the business community and key opinion leaders and decision makers for ITS in Minnesota
- Creation of a traveling exhibit for conferences such as ITS America
- Videos on ITS and Minnesota Guidestar
- Program brochures
- A newsletter geared toward Mn/DOT employees and city/county engineers

Appendix A – Case Studies

- Creation of abstracts on individual Minnesota Guidestar projects
- Development of an ITS lesson plan for science classes or college courses
- Distribution of program material to libraries across the state
- Regular news media events

Funding Opportunities and Sources

A variety of funding sources, both traditional and innovative have been used in funding Minnesota Guidestar. The program has received significant funds through Congressional earmarking over the past nine years. Additionally, Mn/DOT and the local cities and counties have made significant ITS-related transportation investments using state and local funds.

Through the mechanism of public-private partnerships, Minnesota Guidestar has leveraged private sector contributions towards many of its projects and activities. These have typically been in the form of in-kind contributions of labor resources and/or equipment.

Current Status

The program is currently being run on the basis of the Board of Directors' Statewide ITS Strategic Plan 2000 which was implemented in Spring 2000. The Plan contains a number of action items, some of which are already being pursued (see Future Activities planned).

Future Activities Planned

Before the end of 2000, Minnesota Guidestar will initiate a project to develop an ITS Standards Migration Plan for the state. The need for such a Plan originated during Mn/DOT's ITS Standards Workshop held in November 1999 and attended by national standards experts and representatives of a number of state agencies. The results of this workshop showed that despite the significant efforts Mn/DOT has made to keep abreast of emerging ITS standards, the pace of standards development makes it is difficult to keep all stakeholders up-to-date and to ensure that the latest, most relevant standards are being used.

Recognizing that the key to the full integration of systems is the use of commonly accepted standards, Mn/DOT is initiating a study which will result in the development of a Standards Migration Plan. This study will:

- Document Minnesota-specific systems
- Define a vision of what the migration plan should consist
- Define details of what the migration means to Minnesota
- Define education, training and outreach activities to ready stakeholders for migration
- Carry out the migration activities

Each ITS standard will be reviewed, assessed and prioritized; the prioritization being based on each standards' relevance to the latest Minnesota ITS architecture (the architecture developed for the Twin Cities Metropolitan Area which is fully compliant with the National ITS Architecture). The Migration Plan will be based around this prioritization of standards - it will chart the migration from the current state of standards use in Minnesota to a situation where standards are used in a manner fully consistent with the Twin Cities Metropolitan Area ITS architecture and therefore, with the National ITS Architecture. By implementing the highest priority standards identified in the architecture flows, Mn/DOT will begin to implement its ITS architecture.

In addition, there are also substantial plans to develop projects and activities in the program's areas including ATMS, ATIS, IVI and APTS (see Contents - Projects and Activities).

Appendix A – Case Studies

Participating Institutions

Public:	Mn/DOT Office of Advanced Transportation Systems (OATS), Mn/DOT Metro Division, Mn/DOT Districts and Maintenance Divisions, University of Minnesota Center for Transportation Studies, representatives from many of Minnesota's cities and counties.
Private:	Cambridge Systematics Inc., Castle Rock Consultants Inc. Lockheed Martin Federal Systems and SRF Consultants Inc. have each provided support during the development of plans listed above.

Cost Information

The following are estimates of how much each of the Minnesota Guidestar plans cost to prepare.

Title	Date	Public Sector Cost	Private Sector Cost
Minnesota Guidestar Strategic Plan	1992	Estimated to be 30 hours/month over 12 month period (Mn/DOT staff). Additionally, staff attendance at workshops.	$300,000 consultant contract
Minnesota Guidestar Rural Scoping Study	1994	$37,000 over 6 months including two Mn/DOT staff attending each of six Focus Groups.	$100,000 consultant contract
Minnesota Guidestar Polaris Statewide Architecture	1995	Undefined at present	$3,750,000 budget with additional $788,000 contribution from private sector
Minnesota Guidestar Statewide Business Plan for Commercial Vehicle Operations (CVO)	1995	Undefined at present	Undefined at present
Minnesota Guidestar NOVA Strategic Plan	1997	Estimated to be 60 hours/month over 6 month period (Mn/DOT staff). Additionally, staff attendance at two-day workshop.	$150,000 consultant contract
Minnesota Guidestar Board of Directors' Statewide ITS Strategic Plan 2000	2000	Undefined at present	Undefined at present

Benefits

As already stated, Minnesota Guidestar comprises many ITS projects. Benefits of those project already completed and evaluated are widely documented. However, several quantitative benefits arising through the evolution of ITS strategic plans in Minnesota are apparent including:

- Encouraging different agencies to participate in discussion and decision-making regarding ITS has led to each agency having a much better understanding of the other agency's perspectives, goals and capabilities
- Introducing the private sector to the strategic planning process (with the Strategic

Plan 2000) has introduced new perspectives, ideas and opportunities. It has also broadened the "buy-in" to the resulting plan

- The use of public-private partnerships has brought many challenges but has also brought many benefits including the opportunity to leverage different sources of funds, increased "buy-in", broadened understanding of how each sector operates and of the constraints within which it has to carry out its work

Lessons Learned

Public sector lessons learned include:

- As stated above, the importance of bringing different public agencies, many with diverse needs and objectives, together in a single forum to examine the potential offered by ITS solutions. This has to be initiated early enough in the process so that the needs of each agency can be addressed
- Reaffirmation of the essential role that the private sector can play in any ITS-based transportation system
- How to establish the better public-private partnerships and to understand exactly what the private sector can realistically bring to any partnership
- The importance of all understanding all project participants' priorities and expectations

Private sector lessons learned include:

- Appreciating the learning curve that all offices of a state agency have to go through when working under a non-traditional contractual arrangement such as a public-private partnership; for example, review and approval of non-traditional draft contract documents may take longer than usual to be completed
- Learning to work with public agencies as a "partner" rather than as a "client"
- As a counter-point the third public sector lesson learned, the private sector has to appreciate exactly what the public sector can and cannot bring to any partnership
- Appreciating the way public sector organizations work

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Montana Statewide ITS Strategic Plan

Goals

The vision of Montana's ITS program, as outlined in the strategic plan, is to use "advanced technology applications to benefit or enhance existing and future elements of the Montana surface transportation infrastructure by supporting rural and urban applications to enhance safety, mobility and economic vitality in order to meet the specific needs of the Montana traveling public." The plan's goals are primarily focused on developing projects, program integration, education and outreach, funding and deployment. These goals, which are stated in fairly general terms, were expected to yield the following benefits for Montana travelers:

- Construction zone and maintenance operations systems that ensure the safety of Montana's travelers and field operations personnel
- Collision warning devices, including animal detection, to minimize incidents involving foreign objects on the roadway
- Commercial vehicle operations (CVO), including electronic clearance, to enhance the efficient transport of goods and services, and to increase the economic viability of Montana
- Traveler information services that assist with mobility, pre-trip planning, mode and route selection, destination and attraction details and reducing the impacts of weather and traffic incidents, en-route
- Emergency communications devices to assist stranded or injured travelers in communicating with emergency response providers
- Public transit operations and fleet management to effectively handle capacity demands and efficient transport of citizens

Approach

Organizational Approach

As intelligent transportation systems (ITS) gained broader deployment across the U.S. in the early to mid-1990s, the Montana Department of Transportation (MDT) was interested in examining the potential of ITS for Montana, although it was not sure that ITS would necessarily be a good fit for Montana. If ITS turned out to be a good fit, MDT planned to engage in a more formal strategic planning effort. For the first part of this effort, MDI contracted with the Western Transportation Institute at Montanan State University to study the status and applicability of ITS in Montana (1). This document, completed in 1996, identified needs and potential benefits of ITS in Montana, existing systems and related activities in Montana and the rest of the United States, potential ITS systems, and potential funding sources. It concluded with a set of recommendations to ensure the success of Montana's ITS program in the future. As this report concluded that ITS had potential in Montana, MDT decided to pursue a Strategic Plan, which was completed in June 1999 (2).

A Steering Committee was established to provide guidance on key agency contacts and presentation content in order to educate Montanans on ITS applications, how ITS may affect their business transactions, and potential benefits of ITS applications. Its membership consisted of representatives from several MDT divisions, MDT district offices, the Federal Highway Administration, tourism, and public works personnel.

Appendix A – Case Studies

Concurrent with the development of the strategic plan, MDT completed an ITS/CVO business plan in 1998 (3). The business plan's purpose is to encourage coordinated, efficient and safe CVO throughout Montana, and to promote inter-agency and regional cooperation as ITS/CVO projects are developed and deployed. It discusses Montana's CVO priorities and how Montana is addressing them, with current and planned projects discussed. The plan document was authored by MDT staff who were also involved in the Steering Committee.

A consultant-led project team carried out the Strategic Plan.

Technical Approach

MDT's request for proposals (RFP) for the Strategic Plan (4) included the following tasks:

- Refine goals and objectives
- Obtain stakeholder involvement
- Define ITS in Montana since, according to the RFP, "…while the National ITS Program has specific definitions for ITS, Montana may have special advanced technology needs that are not recognized or defined at that level…"
- Identify applicable ITS technologies
- Identify statewide ITS needs and requirements
- Develop recommendations for the most cost-effective communications system(s) required to efficiently deploy pertinent ITS technologies
- Determine human and financial resources necessary to operate and maintain the ITS infrastructure
- Develop a process by whereby an ITS project can proceed from concept through to implementation
- Develop an organizational structure, including the most logical and efficient location for an ITS program within MDT, and program name
- Develop performance measures that will gauge the degree of success and failure and progress of the ITS program and projects
- Identify necessary funding types and levels
- Recommend changes to laws, policies or regulations as necessary to support or enhance the ITS program
- Meet with Montana's three (3) metropolitan planning organizations (MPOs), transit organizations (through the Montana Transit Administration), MDT administrators, and the Montana Transportation Commission to explain the general concept and benefits of the ITS program

Contents

The plan is organized according to the outline of the RFP, devoting one chapter to each task in the scope. The plan "provides the framework for the development of an ITS program in the State of Montana." Its emphasis is not on recommending specific projects, but rather in developing a process by which projects can be implemented in the future. Key elements in the plan include:

- Development of a program vision, mission, goals and objectives
- Identification of stakeholders and champions
- Assessment of Montana transportation needs and definition of ITS program services to meet those needs

- Review and analysis of applicable technologies and communications structure to meet transportation needs, with short, medium and long-range project recommendations
- Evaluation of fiscal considerations, including potential funding sources and strategies
- Integration of project development processes within the MDT capital improvement program
- Development of the ITS organizational structure within MDT
- Review of statutory and policy considerations involving ITS technologies and implementation

Short-Term Projects

The plan defines potential ITS deployments in six (6) needs areas:

- Information needs
- Safety needs
- Commercial Vehicle Operations (CVO) needs
- Emergency Management needs
- Transit needs
- Traffic Management needs

The plan did not provide specific locations for deployment, but identified the following applications as good candidates for implementation in Montana within a one-year time frame:

- Changeable Message Signs (CMS)
- Fog and pavement condition detection systems
- Integrated train detection and traffic control
- Advanced traffic monitoring
- Cellular connection to emergency services
- Weather information by FAX
- Traveler information on the Web

Other short-range ITS strategies identified in the plan include:

- Interactive kiosks
- Highway Advisory Radio (HAR)
- Rail crossing early warning systems
- Animal/vehicle collision avoidance systems
- Transit Automated Vehicle Location (AVL) systems
- Computer-aided paratransit scheduling and reservations
- Weigh-In-Motion (WIM) sensors/devices
- Electronic CVO credentialing
- Automated CVO safety and credential inspection
- Electronic CVO pre-clearance

Architecture Issues

The plan includes a statewide architecture that is based on the National ITS Architecture. It includes a modified "sausage diagram" to depict the communications required to support the various short-term projects identified in the plan. It does not define specific subsystems where actions will take place, and it does not define information flows occurring between subsystems or organizations. During the time of plan development, it was perceived that there was limited Federal guidance about architecture conformity, so that not a lot in this area was expected.

Appendix A – Case Studies

In the chapter on architecture, the plan describes the interrelationships between MDT's ITS Coordinator and other organizations in developing and implementing projects.

Institutional Involvement

Many public-sector partners were engaged in the development of the strategic plan, starting with several divisions and districts across MDT, and including other state agencies, as well as Federal and local organizations. The primary point-of-contact for public-sector participation was in the Steering Committee, with other agencies engaged through the various outreach and education efforts. In exploring inter-agency partnerships in the future of the ITS program, the plan provides a summary table of agencies that may have a future relationship to MDT's ITS program.

Private-sector involvement was focused primarily on defining transportation needs. This involvement was obtained through outreach workshops, with one particular workshop devoted to educational outreach to individual trucking companies.

Participation by academia was represented by the Western Transportation Institute (WTI) at Montana State University-Bozeman. WTI provided support as a project subcontractor, assisting with stakeholder outreach efforts. Per the RFP, WTI is also included in the plan as a "viable source of information, research and technical support" in future ITS project development.

Organizational Issues

The Montana ITS Steering Committee was comprised of representatives from several MDT divisions (motor carrier services, transportation planning, maintenance, engineering, right-of-way), MDT district offices, the Federal Highway Administration, emergency services (State Department of Public Health and Human Services and the Department of Military Affairs' Disaster and Emergency Services Division), tourism (Travel Montana), transit (Fergus County Council on Aging, Helena Dial-a-Ride) and public works (Cities of Billings and Missoula) personnel. The Steering Committee provided guidance on key agency contacts and presentation content to educate Montanans on ITS implications, how ITS can affect their business transactions, and the benefits of ITS applications. It met every two to three months to review project deliverables presented by the consultant.

As its primary purpose is to define the Montana's ITS program, the plan maps out roles for the ITS coordinator, project development teams, and supporting organizations in implementing ITS projects in Montana. The decision on where to place the ITS coordinator position within MDT's divisions is left to MDT's Administrative Division. The organizational structure envisioned for Montana's ITS program is shown in Exhibit 1 presented at the end of this Case Study.

Outreach, Marketing & Education Activities

An education effort was performed as a part of developing the strategic plan. This was beyond inreach efforts within key agencies. The outreach effort consisted of selecting outreach groups, mailing a presentation showing potential ITS applications, and making phone calls to go through the presentation. Personal meetings, following a similar format, were held with two groups: the 9-1-1 Advisory Council, which serves to combine resources to develop 9-1-1 and enhanced 9-1-1 coverage statewide; and individual trucking companies. The desired result of all these efforts was to generate enthusiasm, buy-in, and the necessary commitment to successfully deploy ITS throughout the state.

The plan also included outreach efforts to define transportation needs and identify candidate ITS applications. Three workshops were held in cities across the state selected to capture different local geography, transportation infrastructure, and traveler and resident demographics. Over 600 stakeholders were invited to participate in the focus groups, including stakeholders from law enforcement, city/county planning, tribal government, transit agencies, state Parks, tourism, trucking, and metropolitan planning organizations. Meeting invitations also included a questionnaire that allowed those who could not attend to provide their perceptions of transportation challenges, potential ITS solutions and barriers to ITS implementation.

Other activities related to outreach, marketing and education included the following.

- The MDT web site provided information about the project's existence, as well as a point-of-contact. Documents were not furnished on-line
- There were a couple of presentations to executive-level MDT staff during the course of the project to provide information on project progress

Funding Opportunities and Sources

The plan reviews Federal and state sources that may be used to fund ITS applications. At the Federal level, the plan details the funding capabilities of the Transportation Equity Act for the 21st Century (TEA-21), passed during the completion of the plan document. At the state level, the plan suggests partnering with commerce or tourism agencies and highway safety agencies to support traveler information systems, and using air quality management funds to support ITS technologies that help to manage congestion. The potential of using local sources is mentioned, although specific agencies or organizations are not identified and it is emphasized that the benefits of the ITS must be demonstrably clear. Private sector funding is mentioned as a possibility for some ITS elements, such as new technologies that are in an operational test phase, systems that may accept advertising (e.g. kiosks) or systems that can discriminately benefit select users and assess usage fees (e.g. cellular phone services).

The plan uses case studies from across the country to show how funding sources may be mixed for capital and operations and maintenance costs. The plan does not identify specific funding levels required to support ITS in Montana.

Mainstreaming ITS into Planning Process

The plan has a significant emphasis on mainstreaming ITS into the project development and deployment process. It describes how ITS projects may be initiated through several avenues, including at the district level, the division level, from the ITS Coordinator, and from other agencies outside of MDT. A review of projects by the various divisions within MDT (Highways and Engineering, Rail, Transit and Planning, Maintenance, and Motor Carrier Services) will facilitate incorporation of ITS activities into all functional areas at several project process levels.

The plan also describes how ITS will fit in with MDT's Performance Programming Process, which will take candidate applications from concept to fully deployable project plans.

Other keys to integrating ITS into the planning process include identifying ITS champions within the various MDT divisions, and demonstrating projects' potential cost-effectiveness through a comprehensive assessment of estimated costs, including project design, development, implementation, and operation and maintenance.

Appendix A – Case Studies

The plan describes how ITS projects can fit within state programs. This would be done by aligning the project with TranPlan 21 (Montana's statewide transportation plan) policy goals, verifying that proper national standards are being used for data exchange, verifying that the necessary transportation infrastructure is planned or in place, ensuring the project is not redundant to other existing or planned programs, verifying the project has buy-in from all affected parties, and confirming that project goals and objectives are consistent with those of Montana and the nation.

Operations and Maintenance

The plan presents estimates of operations and maintenance (O&M) costs for those short-term projects where case study information was available. O&M costs were subdivided into separate operations and maintenance components, with each component subdivided into monetary costs (for parts, fuel, etc.) and staff costs (in terms of maintenance personnel hours). Case study costs were factored up to a statewide basis for Montana based on estimated deployment quantities. Travel time was mentioned as a significant portion of staff costs but was not financially included, primarily because the plan did not include specific deployment locations.

Other Key Features

- One chapter is devoted to the communications infrastructure required to support Montana's ITS projects, with communication recommendations and cost estimates provided for each short-range project
- The plan includes a section addressing liability issues for each of the immediate-term (one-year) technologies proposed in the plan. Also included are discussions of information use and privacy and resource sharing

Current Status

The strategic plan was completed and subsequently approved by MDT Executive Staff (see Exhibit 1) in June 1999. The project resulted in the creation of a statewide ITS coordinator position in MDT's Planning Division.

Future Activities Planned

Currently, no dedicated funding for ITS projects is provided, so proposed projects must compete for funding with "traditional" projects in MDT's statewide transportation planning process. There are no current plans to create a more deployment-oriented strategic plan. The Steering Committee dissolved with the completion of the Strategic Plan, and no replacement group of similar membership was subsequently formed.

Participating Institutions

Public:	Montana Department of Transportation (Motor Carrier Services, Transportation Planning, Maintenance, Engineering, and Administration Divisions) – Project Lead Travel Montana Montana Department of Military Affairs Montana Department of Public Health and Human Services Billings Public Works Missoula Public Works Fergus County Council on Aging Helena Dial-A-Ride Federal Highway Administration (FHWA)
Private:	Castle Rock Consultants, Inc. – Prime Contractor Advanced Technologies Applications Associates – Subcontractor
Academic:	Western Transportation Institute, Montana State University-Bozeman – Subcontractor

Cost Information

The strategic plan budget was approximately $200,000, with 80 percent Federal and 20 percent State funding. The plan did not provide funding for deployment, evaluation, or estimating benefits of deployed projects.

Statewide ITS Plan	1997-1999 (25 months, between notice-to-proceed and receipt of final document)	$199,864

Project Task	Cost
Regional Architecture	$ 60,000

Level of Involvement	Cost
Steering Committee (per person)	8 hours per month
MDT Staff (per person)	25-30 hours per month

Benefits

The plan did not include funding to evaluate projects after deployment to quantify their benefits. It did develop candidate objectives for each of the potential ITS deployments deployed in the plan, which could provide a starting point for future assessments of project benefits.

Lessons Learned

Public Sector

- The cost information provided through case studies of individual technologies is very helpful in evaluating future ITS investments
- The strategic plan needs to lay the groundwork for future program sustenance, through the creation of a standing ITS committee, as well as specific plans for future deployment

Appendix A – Case Studies

Private Sector

- Greater emphasis needs to be placed on distributing the results of the Strategic Planning process to those who attended stakeholder workshops
- Significant work was required to bring in local or non-MDT stakeholders because little outreach was done outside of the three workshops. Outreach tools such as a Web site or brochures would have been helpful

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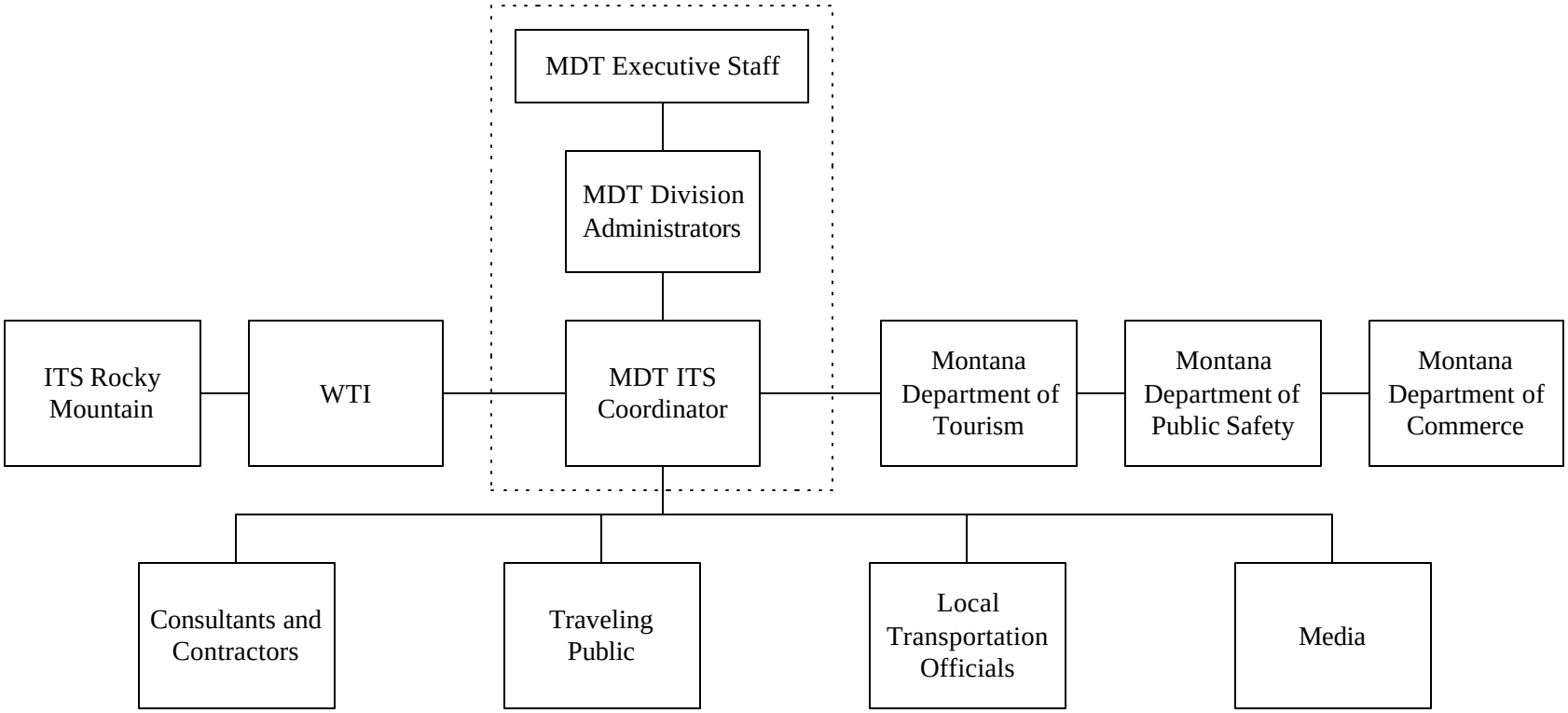

Exhibit 1 - Proposed Organizational Chart for Montana's ITS Program

Appendix A – Case Studies

Nebraska ITS Statewide Strategic Plan

Goals

The goals of the Nebraska Intelligent Transportation Systems (ITS) Statewide Strategic Plan were developed for each of eight critical program areas (CPA), and are shown in the following table.

Critical Program Area	Goals
Traveler Safety and Security	1. Improve railroad grade crossing warning 2. Improve traveler road information
Emergency Services	1. Improve statewide radio communications for emergency services 2. Improve availability of, and access to, 911 systems statewide 3. Improve patient transport and transfer capabilities in emergency situations 4. Improve interstate, highway, and state road incident management and incident reporting
Tourism and Traveler Information Services Goals and Objectives	1. Improve accessibility to traveler/ tourism information 2. Assess feasibility of conducting "commerce" on right-of-ways using smart cards 3. Improve communication and coordination regarding ITS and ITS infrastructure among state agencies
Public Traveler Services/ Public Mobility Services	1. Increase coordination among transit providers in rural communities 2. Improve provision of transit services in rural communities
Infrastructure Operations and Maintenance	1. Improve maintenance management systems statewide
Fleet Operations and Maintenance	1. Improve ability to locate and track fleet vehicles 2. Implement mechanisms for prioritization/ re-assignment for fleet maintenance vehicles
Commercial Vehicle Operations	1. Improve accessibility to existing data 2. Improve conditions for seasonal transport 3. Improve efficiency of vehicle clearance at weigh stations and safety inspections 4. Improve hazardous materials incident response 5. Improve information exchange/ dialogue for planning (trucking companies, state agencies, railroads, communities)
Communications	1. Improve statewide radio communications for emergency services 2. Improve statewide geographic information systems (GIS) use and access for ITS

These goals are subdivided into a total of 59 objectives, which are detailed in the plan document (1). These objectives provide more detail as to specific technologies and applications that may be used to help realize these goals.

Approach

Organizational Approach

The Strategic Plan was motivated by the need to provide direction to ITS efforts in Nebraska, and Federal Highway Administration (FHWA) encouragement of similar efforts. It was initiated in late 1997, prior to large-scale implementation of ITS in the state, but after the completion of an early deployment study for Omaha. The approach used in the Omaha study was viewed by Nebraska Department of Roads (NDOR) staff as very successful, and consequently was adopted in the statewide plan.

NDOR's ITS Coordinator acted as project manager and liaison to other NDOR divisions to ensure access to information needed in the planning process. NDOR's Assistant ITS Coordinator assisted by providing additional research materials, data and professional ITS contacts. The statewide ITS planning study was conducted by the University of Nebraska-Lincoln, under the oversight and guidance of a Steering Committee. The Steering Committee, whose membership is discussed later, served to monitor progress of the study and focus on key issues pertinent to developing the plan.

The members of the Steering Committee were assigned into eight teams by critical program area (CPA). Working assignments were matched to members' professional experience; some members of the Steering Committee served on more than one CPA. These working groups were responsible for assessing needs within their own CPA, and identifying potential solutions. This approach allowed working groups to be smaller in number with a higher level of interest in topics. The potential deficiency of this approach – a lack of collaboration among stakeholders of different CPAs – was avoided through regular meetings of the Steering Committee throughout the project.

Technical Approach

The research team followed the Rational Planning Model, as shown in Exhibit 1, in the development of the plan. This framework was intended to provide a more generalized approach to the ITS planning process that would be adaptable to the complexity of program, committee and political structures in Nebraska. The model was applied with the following steps:

- A need assessment (Phase I), which relied on a series of interviews, a focus group, several surveys, several meetings and extensive review of existing documents (including other Nebraska statewide plans)
- Design of alternatives (Phase II), which was based on technologies and management systems implemented by other regions, states and countries, with consideration of cost, user acceptance, proven project success, cultures and environments
- Estimating the consequences of ITS alternatives (Phase III), which involved an annualized assessment of benefits and costs
- Selection of project alternatives for further action

The remaining steps shown in Exhibit 1will be under the direction of NDOR and other key stakeholders as the plan proceeds into implementation.

The research team had considered a technical approach based on the National ITS Architecture and its established user services. This approach was rejected because 1) many user services had limited applicability to rural Nebraska; and 2) certain user service bundles did not match the expertise or interest of Steering Committee members. The team assessed that pursuing this

strategy would have risked losing the interest of project stakeholders, reducing their participation in the planning process.

Contents

The plan consists of two volumes: a summary report and a volume of technical appendices (1). The report is focused primarily on describing the projects that resulted from the planning process, with a presentation of associated costs and benefits. It includes a description of the methodology used in developing the plan, a review of goals and objectives, and a blueprint for implementation of ITS projects in Nebraska. The following section describes some of the major points of emphasis of the plan in greater detail.

Top Needs and Priorities

The assessment of needs and identification of potential solutions was done by Critical Program Areas (CPA), using the seven identified by the Federal Highway Administration, plus an eighth area of communications. This eighth area was viewed as critical to the success of ITS in Nebraska across the other CPAs and was therefore included as a CPA in and of itself.

Needs within each CPA were identified through a combination of surveys, focus groups, interviews, and other appropriate statewide plans and documents. Needs were translated into a series of priorities within each CPA. Each priority was restated as a goal, which was then partitioned into several objectives.

Projects identified through the plan were divided into short, medium and long-range projects. Some of the 39 short-term projects described in the plan include:

- Variable messages signs, surveillance and highway advisory radio on I-80 between Lincoln and Omaha
- Kiosks at major activity centers throughout the state
- An Internet-based traffic information system
- Automatic vehicle location and computer-aided dispatch to facilitate coordination and improve efficiency of rural transit

Many other short-term efforts are focused on system requirements and feasibility studies to support medium and long-term elements of the ITS deployment. Medium and long-term elements include:

- Test deployment of safety warning systems at private railroad-highway grade crossings
- An interoperable radio communications system
- A coordinate-based address system
- Statewide coordination of rural transit service
- Implementing a statewide traffic management center (TMC)
- Adding weather stations that are capable of TMC remote access
- Integration of incident management systems with the TMC
- Deploying smart work zones
- Adding automatic vehicle location to snow plow and patrol vehicle fleets for real-time tracking at the TMC
- Additional automated pre-clearance and weigh-in-motion sites
- Implementation of a communications master plan

The costs and number of projects associated with each time are as follows:

- 39 short-term projects, targeted for implementation in 2000-2005, at an estimated cost of $12 million
- 38 medium-term projects, targeted for deployment by 2010, at an estimated additional cost of $226 million
- 31 long-range projects, intended for deployment by 2020, at an additional cost of $79 million

Architecture Issues

The plan includes a statewide architecture that was not developed directly from the National ITS Architecture. The architecture included in the plan shows connections between a statewide traffic management center and a multitude of transportation systems around the state. It indicates in broad terms the data exchange needs between systems, and is guiding development of initial functional requirements of systems, such as the statewide traffic management center.

Since the completion of the plan, NDOR has had Tier I and Tier II Architecture workshops. The goal of these workshops was the development of a regional architecture with a focus on incident management in the I-80 corridor between Omaha and Lincoln. The Tier I workshop included an orientation to the National ITS Architecture, an overview of Federal interim guidance on ITS, and a presentation by the National ITS Architecture Team. The first day of the Tier II workshop included a general introduction to ITS architecture, and an overview of national and regional ITS-related resources and activities. The second and third days included a series of briefings and breakout sessions intended to provide information required to develop the incident management architecture.

Conformity to the National ITS Architecture will be pursued on a project level, as projects proceed from concept to design to deployment. Broad participation in the Tier I and Tier II workshops was intended to ensure that everyone who is considering involvement with ITS projects in the future knows what is expected and how to comply with Federal guidance.

Institutional Involvement

Institutional involvement in developing the plan focused primarily on public, state-level organizations, from the highway, transit, trucking, public safety, and tourism communities. It proved to be easier to engage state-level organizations since they generally had some knowledge of the applications and benefits of ITS through previous involvement in the Omaha Early Deployment Plan. Engaging regional and local stakeholders, especially from the rural parts of the state, proved challenging, because of their lack of experience with ITS. The primary avenue of institutional involvement was the Steering Committee.

There was limited involvement from the private sector in the planning process. In general, private companies did not want to get involved in the plan without being able to see how ITS would benefit their bottom line.

For implementing ITS projects, the plan discusses the utilization of public-private partnerships in order to leverage funding and share risks.

The University of Nebraska-Lincoln, which played a significant role in the Omaha Early Deployment Plan, was tasked with putting together the statewide plan, and therefore had a primary role in every aspect of the project.

Organizational Issues

The overall project organizational chart is shown in Exhibit 2 presented at the end of this Case Study. An ITS Steering Committee was formed to monitor and guide the ITS planning process for the State of Nebraska. Members represented several divisions within NDOR as well as the following organizations:

- Nebraska Department of Motor Vehicles
- Federal Highway Administration
- Nebraska Department of Economic Development, Division of Tourism
- Nebraska Department of Administration Services, Division of Communications
- Nebraska State Patrol
- Nebraska Health and Human Services System

Additional responsibilities of Steering Committee members included participating in CPA work group meetings, providing additional key contacts, supplying documents, recommending ITS projects and strategies, and creating ITS awareness within their respective organizations.

Eight work groups, one for each critical program area, served to identify transportation needs and potential ITS applications. They met approximately every month.

A CVO focus group, which met approximately every two or three months, was used to provide additional information. It was intended to be a forum for significant private-sector involvement, but did not succeed in doing this for reasons cited earlier.

The plan recommended the creation of an ITS Implementation Committee to succeed the Steering Committee. This committee would ensure the deployment of projects as defined in the plan, through the following activities:

- Initiation and oversight of several forums (EMS communications, traveler and tourism information, rural transit, CVO and communications)
- Establishment of priorities for project implementation
- Identification of funding sources and lead agencies for ITS project implementation
- Promotion of public/private partnerships appropriate for the implementation of ITS projects
- Updating of the ITS plan on a regular, continuing basis

The membership of the Implementation Committee was envisioned to extend beyond organizations represented on the Steering Committee to include broader representation from the commercial vehicle community (including State Patrol's Motor Carrier Enforcement, Department of Environmental Quality's Hazardous Materials Transportation Division, and the Nebraska Motor Carriers Association) and the railroad industry. This goal was completed with the formation of an ITS Action Team after the plan was approved.

Outreach, Marketing & Education Activities

Several outreach methods were used through the CPA work groups to identify needs, establish goals and objectives, and generate ideas for potential projects; these include:

- A survey by mail of 695 Nebraska highway superintendents, public works and city/county officials

- A survey of 490 fire chiefs, ambulance drivers and rescue squads throughout Nebraska
- Interviews with over 150 transportation officials, including public and private transportation officials, ITS officials and ITS equipment vendors
- A CVO focus group, which represented various commercial carrier backgrounds
- Outreach to various organizations to assess communications needs, including radio, television, telecommunications, electric utilities, and railroads

The plan did not include any other marketing activities as a part of its development.

During the development of the plan and in the time since its approval, NDOR has conducted ITS awareness sessions across the state, both for NDOR personnel as well as cities and counties. This ongoing educational process has helped to promote buy-in for ITS initiatives.

The plan identified six statewide committees and organizations within Nebraska whose objectives are similar to the intent of the Nebraska ITS planning and deployment study. The plan describes the need to perform outreach to these different groups as part of fulfilling the deployment objectives of the ITS plan.

Funding Opportunities and Sources

The plan lists a series of Federal, State and regional/local funding sources that may be used for ITS projects. Federal sources identified include the Surface Transportation Program (STP), National Highway System (NHS), Congestion Mitigation and Air Quality (CMAQ) Improvement Program, Intelligent Vehicle Highway Systems (IVHS) Act, Highway Bridge Replacement and Rehabilitation Program, Scenic Byways Program, Congestion Pilot Pricing Projects, and Federal Transit Administration (FTA) funds. Other Federal agencies may be included as partners, such as the Department of Health and Human Services, Department of Agriculture, Office of Rural Development, and the Environmental Protection Agency.

At the State level, the plan emphasizes the use of interagency partnerships among the following organizations: State Patrol, Health and Human Services, Department of Economic Development, Department of Administrative Services, Department of Motor Vehicles, and Nebraska Department of Roads.

Potential local funding sources include metropolitan/regional planning organizations and city governments.

Non-traditional funding sources, such as public/private partnerships and grant seeking/writing, are also listed. Public/private partnerships are viewed as a key tool to achieve what neither party can do alone, thus circumventing funding constraints.

The plan does not provide additional detail about the levels of funding available at each level. Currently, NDOR has about $400,000 in Federally earmarked funding with a $400,000 state match dedicated for ITS. New leadership at NDOR has promised dedicated funding to ITS initiatives at a level to be determined.

Mainstreaming ITS into Planning Process

The plan does not prescribe guidelines for mainstreaming ITS into the NDOR planning process. The ITS Action Team is expected to facilitate mainstreaming efforts.

Operations and Maintenance

In assessing the consequences associated with each project, the plan included annualized estimates of operations and maintenance costs. These were estimated at 10 percent of capital costs.

Other Key Features

The plan described hindrances to the implementation of ITS in Nebraska, including the staffing and educational needs of transportation agencies, the development of design and performance standards, liability associated with public/private partnerships, and privacy issues associated with surveillance and sensing equipment.

Current Status

The Nebraska ITS Statewide Strategic Plan was completed in December 1998. The plan has now proceeded into the implementation phase through the ITS Action Team, a group with similar membership to the Steering Committee. Some current or recent deployment activities include:

- A request-for-proposals for functional requirements for a statewide transportation management center
- Deployment of nine dynamic message signs in the omaha area
- Deployment of 15 tourism and weather kiosks at rest areas, under the leadership of the state's division of tourism with some private-sector participation
- Weigh-in-motion and pre-clearance installation at two additional weigh scale stations between Lincoln and Omaha

A recent re-structuring of NDOR has resulted in dedicated funding for ITS projects. NDOR's ITS program will continue to seek funding beyond this allocation.

Future Activities Planned

NDOR is continuing to pursue deployment activities, primarily in the eastern part of the state. The statewide transportation management center, which will integrate transportation systems across the state, is in the functional requirements process. NDOR is also continuing to hold ITS awareness sessions across the state.

Participating Institutions

Public:	Nebraska Department of Roads (Planning Division, Intermodal Transportation Division, Maintenance Division, and Traffic Engineering Division) Nebraska Department of Motor Vehicles Nebraska Division of Communications Nebraska Health and Human Services System Nebraska State Patrol Department of Economic Development, Division of Travel and Tourism Federal Highway Administration (FHWA)
Academic:	The University of Nebraska-Lincoln

Cost Information

The statewide strategic plan, which was funded by a combination of State and Federal dollars, cost $60,000. The plan was relatively inexpensive because it was able to leverage efforts from the Omaha Early Deployment Plan to lower costs, as it followed a similar methodology. The plan did not include any funding for deployment or demonstration of ITS projects, or for evaluating benefits of deployed technologies.

Title	Time	Contractor Cost
Omaha Early Deployment Plan	Completed 1995	$450,000
Statewide ITS Plan	1997-1998 (14 months)	$ 60,000

Level of Involvement	Cost
NDOR Staff (per person)	25-30 hours per week
Work Group Members (per person)	20 hours per month

Benefits

The primary benefit of the statewide ITS planning process was a "doable" plan – i.e. a plan that provided NDOR with guidance for proceeding with a statewide ITS program. The process of completing this plan also had benefits, in terms of creating ITS awareness among state agencies and formulating partnerships for future deployments.

The benefits resulting from future deployment was a key consideration in prioritizing projects in the statewide plan. The plan estimates benefits for each project included in the plan as a part of benefit-cost calculations. Estimated benefits include the likely reduction in frequency, duration and severity of incidents; reductions in traveler delay due to incidents and work zones; improved efficiency in traffic management, transit, emergency services, roadway maintenance and commercial vehicle credentialing operations; improved efficiency for commercial vehicle operators; and additional revenue from increased tourist traffic. Benefits were assigned on an annualized basis, in order to develop benefit-cost ratios for each project. Benefit-cost ratios were not directly used to determine prioritization of projects, as some projects with a poor benefit-cost ratio initially could be used as a foundation for more beneficial projects later.

There is no systematic plan to estimate the realized benefits of ITS projects as they are deployed. NDOR is planning to report on an annual basis its deployment and integration activities to the state's transportation commission.

Lessons Learned

- It is important to find the right people for the Steering Committee and work groups. The Nebraska effort had a Steering Committee with people who were interested in and had some knowledge of ITS and its potential applications to benefit their agencies.
- It takes a lot of patience and perseverance to develop a good strategic plan. The biggest challenge was in data compilation: finding out which organizations are doing what. In many cases, organizations are pursuing ITS initiatives without realizing they classify as ITS.
- It would have been good to get more private-sector involvement, as well as deeper involvement at the state agency and NDOR levels. This was difficult to do under the budget.

References and Contact Information

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1. Patrick T. McCoy, Sharon L. Gaber, John A. Gaber and William D. Tobin, *Nebraska Intelligent Transportation Systems (ITS) Plan* (2 volumes). Report Number FHWA-NE-99-P511, University of Nebraska-Lincoln: December 1998.

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Exhibit 1 - Nebraska ITS Planning Process/Rational Planning Process

Appendix A – Case Studies

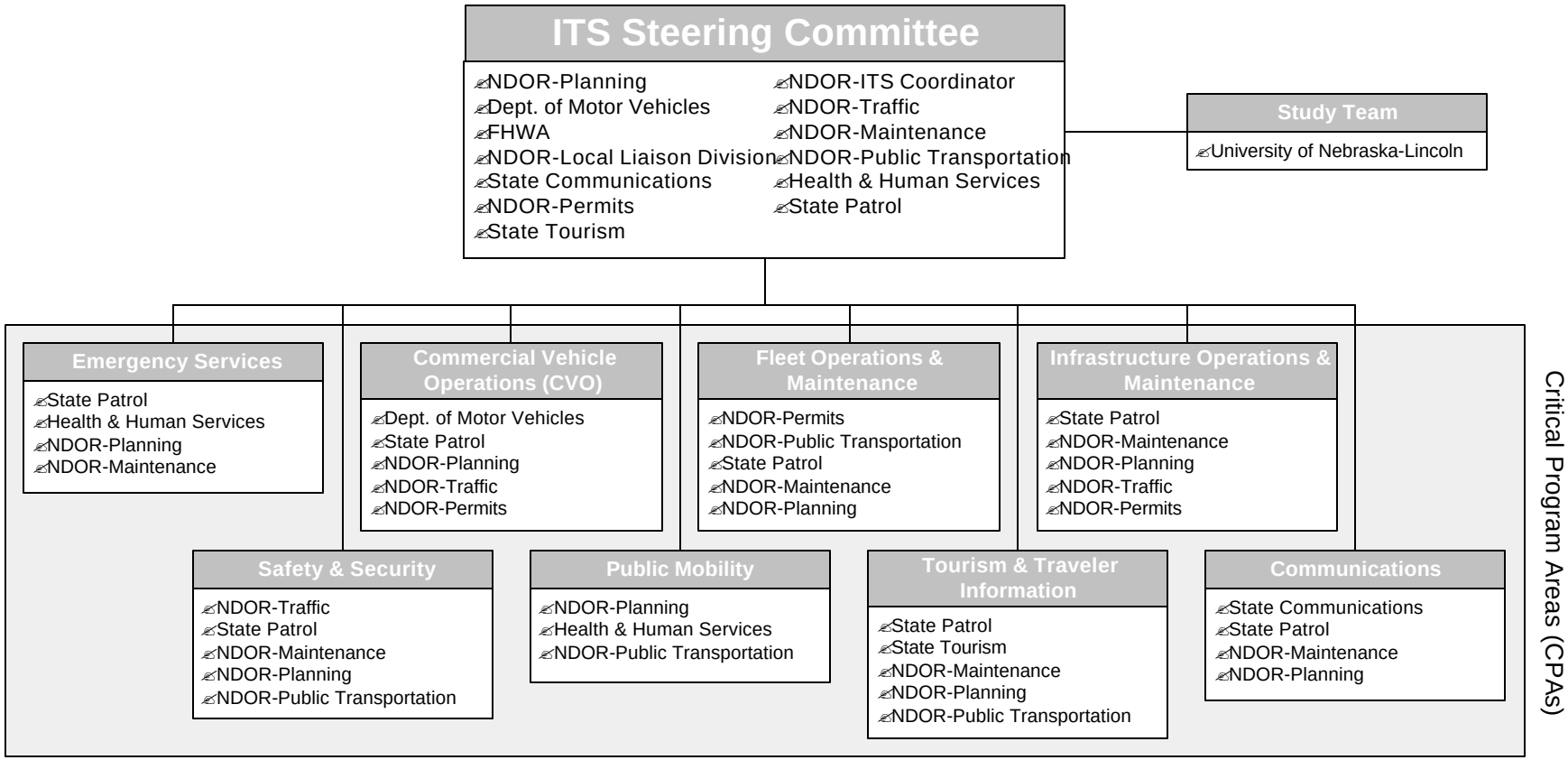

Exhibit 2- Nebraska Strategic Plan Organizational Chart

Appendix A – Case Studies

New Mexico ITS Strategic Plan

Goals

The goals of New Mexico's statewide ITS program, as listed in Chapter 2 of its statewide strategic plan (1), are as follows.

- Improve incident management and coordination, including dispatch/notification, response times, incident clearance, and interagency communications
- Improve traffic safety and reduce delays through congestion mitigation measures
- Improve the accuracy, timeliness, and availability of real-time traffic information and roadway conditions information to motorists
- Improve accessibility to and types of information for tourists
- Improve electronic clearance capabilities for commercial vehicles
- Provide information about available services and roadside assistance for remote travelers
- Implement systems to enhance public traveler service in urban and rural areas
- Provide accurate and timely information to motorists about special event traffic
- Develop a plan to educate agencies and stakeholders about ITS and increase awareness of ITS in New Mexico
- Implement systems that will help to reduce the number of animal-vehicle collisions
- Enhance communications and interconnectivity among agencies in New Mexico
- Improve road maintenance operations, particularly in response to inclement weather and other hazardous conditions

These goals were formulated through an analysis of high priority needs as identified through stakeholder workshops and review by the Steering Committee, both of which will be discussed later.

Approach

Organizational Approach

The Statewide ITS Planning effort was led by the New Mexico State Highway and Transportation Department (NMSHTD) and the Federal Highway Administration (FHWA). The effort occurred nearly concurrently with two district-level efforts in New Mexico. These efforts, in Districts Three (Albuquerque) and Four (rural northeast part of the state), were funded through district funds. In District Three (Albuquerque), a Construction Intelligent Transportation System (CITS) was established as part of the "Big I" (the I-25/I-40 interchange) reconstruction – to improve traveler information and safety. District Three was also in the planning stages of the Albuquerque Advanced Metropolitan Travel Management System (AMTMS) while the Statewide ITS Plan was being developed. The AMTMS will serve as the Albuquerque area's regional ITS including traffic management and traveler information, incident management, and communications. District Four also developed a Draft ITS Deployment Plan, to address issues such as improving weather detection, automating certain maintenance functions, and providing improved pre-trip and en-route traveler information to motorists and maintenance crews.

These efforts provided assistance in a couple of strategic ways for New Mexico's statewide effort. First, the needs assessment activities involved in each of these efforts were used as additional input into a broader statewide assessment of ITS needs. Second, these efforts

presented recommendations for ITS infrastructure, such as transportation management centers (TMCs) and communications systems, that could serve to support the broader statewide effort.

The district efforts were done by two different consulting teams, one of which also led the statewide effort. Through close coordination and communication, they were able to ensure consistency between the plans in architecture and integration as well as specific technology strategies.

A Project Steering Committee was established to guide the development of the New Mexico ITS Strategic Plan. The committee included staff members from NMSHTD, New Mexico Department of Public Safety, FHWA, one county (Bernalillo), two cities (Las Cruces and Santa Fe), and the Arizona Department of Transportation. The purpose of the Project Steering Committee was to provide ongoing guidance, reviews, feedback, and consensus as the development of the Plan progressed. The Steering Committee was expected to provide guidance over an 18-month period, although the Plan was completed in 10 months.

Technical Approach

Development of the strategic plan consisted of the following steps:

- Identify stakeholders
- Inventory transportation system
- Identify user needs
- Identify market packages
- Develop ITS architecture and measures of successful deployment
- Identify projects and information sharing requirements
- Develop operational and maintenance costs
- Prepare final report and executive summary

Contents

The plan document starts by reviewing the project approach and scope, and identifying and inventorying stakeholders. After discussing the needs identified through stakeholder workshops, the plan prioritizes market packages that may be applicable to the state. Based on the market packages, the plan presents high-level logical and physical architectures to depict the integration of various functions and stakeholders. The market packages also served as an entry point for identifying short-term, mid-term and long-term projects, which are listed along with cost information. The final chapter reviews how the statewide deployment should be integrated with architecture efforts developed for the District Three AMTMS and the District Four Rural ITS Deployment Plan.

Top Priorities

The plan presents project recommendations in three time frames: short-term (2002-2006), mid-term (2007-2011), and long-term (2012-2021). The short-term projects identified in the plan include:

Traveler Information

- Implementing a Maintenance, Incidents, and Road Closure Information System (MIRCIS) to collect and disseminate road conditions information
- Installing dynamic message signs and highway advisory radio at key decision points
- Convert all existing traveler information numbers to 511
- Integrate traveler information into a single Internet site

- Link 511, Web page and autofax to MIRCIS

Traffic Management

- Implement an Advanced Metropolitan Traffic Management System (AMTMS) in Albuquerque with CCTV, DMS, HAR, RWIS, detection and communications
- Installing road weather information systems (RWIS) at locations subject to blowing, dust, rain and/or snow conditions
- Installing closed-circuit television (CCTV) cameras for incident detection and traffic monitoring
- Implementing smart corridors (with CCTV, video detection, DMS and interconnect) along key arterials
- Integrate freeway and arterial operations and management strategies
- Develop statewide detour plans

Emergency Management Systems

- Upgrade statewide emergency response radio system
- Provide for an integrated multi-agency emergency communications system
- Integrate emergency response facilities with TMCs (virtual connection or physical collocation)
- Improve incident reporting through a toll-free cellular phone number

Private Sector Initiatives

- Work with private sector to expand cellular coverage
- Work with private sector to provide traveler information by expanding existing and developing new partnerships

Architecture Issues

The New Mexico plan considers architecture to be an essential framework within with ITS projects can be designed and deployed in an integrated fashion. The National ITS Architecture was used as a foundation for the New Mexico statewide architecture because it would reduce the time and costs required in developing a regional architecture by providing a framework and process to follow, and it intrinsically allows for future expansion, information exchange and system integration. The plan addressed several key elements of the National ITS Architecture:

- **Inventory -** Section 1.5 provides an inventory of New Mexico's existing ITS infrastructure mapped to the National ITS Architecture's nineteen subsystems.
- **Market Packages -** Market packages were selected based on identified needs and challenges. Needs identified through focus groups, questionnaires, and the Steering Committee were mapped to ITS Architecture market packages. In a couple of cases, needs were not addressed by any existing market package, especially in the areas of construction and maintenance. Market packages were prioritized with input from the project Steering Committee and NMSHTD staff into short-term, mid-term and long-term deployment timeframes.
- **Logical Architecture** - The plan includes a high-level logical architecture diagram to lay out the major functions and information flows across the state.
- **Physical Architecture -** A high-level architecture interconnect diagram is included. It is similar in structure to the National ITS Architecture "sausage diagram", but provides more detail by identifying specific subsystems and technologies by name (e.g. CCTV, New Mexico Emergency Management Centers). This was felt to be more accessible to stakeholders than the generic National ITS Architecture sausage diagram.

Appendix A – Case Studies

No effort was made to develop information flow diagrams due to budget constraints. For the district-level plans, information flow diagrams are included.

One unique aspect about the statewide plan is its concurrent development with district-level plans. Therefore, the architecture developed in the statewide plan was designed to be a high-level template, to provide a framework in which ITS could be integrated throughout the state. The plan took the functions identified in logical architectures developed for the state and Districts Three and Four, evaluated centralized and distributed integration concepts, and developed a hybrid concept to address the different needs of the specific functions. For example, this hybrid integration concept centralizes many traveler information functions but keeps incident and emergency management control as a local, distributed function. Again, the consultant teams coordinated their efforts to ensure that the statewide architecture incorporated more detailed architectures developed at the district level.

Institutional Involvement

The Steering Committee was the primary vehicle of public agency involvement. The Steering Committee members included NMSHTD staff from several divisions; New Mexico Department of Public Safety, FHWA, county and city government, and a neighboring state DOT.

Attempts were made to secure private-sector involvement, but there was limited interest shown by private-sector concerns, and the project budget did not provide resources for additional outreach and promotion specifically to the private sector.

Academia was not involved in the development of the statewide plan

Organizational Issues

The Project Steering Committee was structured to be the driving force behind the New Mexico ITS Strategic Plan. Its purpose was to review project deliverables, and provide guidance, feedback and approval for Plan recommendations. Four meetings of the Steering Committee were scheduled over the duration of the project.

Outreach, Marketing & Education Activities

Several activities were undertaken to promote outreach and education during the development of the plan.

Three focus group workshops were held early in the development of the Strategic Plan. The purpose of these focus groups was to educate stakeholders about ITS and potential applications in New Mexico, provide an overview of the New Mexico ITS Strategic Plan project, and solicit input as to transportation needs and how ITS can address those needs. Invitations mailed to potential invitees included a questionnaire that could be filled in and returned for those who could not attend. Attendees included NMSHTD and FHWA staff, city and county engineers and planners, police and DPS staff, transit agencies, regional planning organizations, and the private sector. The workshops included an educational component in the form of a video about ITS as well as a discussion and prioritization of transportation system needs. Materials provided by FHWA were made available to workshop attendees as well.

Four project fact sheets were developed and distributed through the course of the project, to educate and inform stakeholders of progress in the development of the plan.

The plan sought to engage a variety of stakeholders beyond the Steering Committee. Potential stakeholders identified included other Federal and state agencies, Native American communities, other state departments of transportation, more counties and municipalities, regional and

metropolitan planning organization, chambers of commerce, and New Mexico schools. These groups were put on the mailing list for fact sheets throughout the project, and were invited to participate in the workshops mentioned earlier.

NMSHTD maintained a Web site through the duration of the development plan, from which project deliverables could be downloaded.

1. In addition to the strategic plan document, a four-page executive summary was prepared to serve as a summary of the statewide effort (2). This summary included a depiction of the physical architecture as well as a summary of key project recommendations.

The consultant made a presentation near the beginning of the project to the New Mexico Paving Conference, which helped to provide additional outreach to cities and counties.

Funding Opportunities and Sources

Using estimated quantities of deployment based on what would be required to support a basic, functional statewide system, the plan provides estimates for each time frame of capital costs, planning, design, contingency and construction engineering costs, and annual operations and maintenance costs.

The plan does not denote potential public funding sources that may be tapped for projects. The plan designates market packages where the private sector role may be best utilized, focusing on areas of a high likelihood in cost recovery and lower technical risk. These market packages include broadcast or interactive traveler information, autonomous or information service provider (ISP)-based route guidance, and transit traveler information. The plan describes current private initiatives in New Mexico, as well as provides an overview of potential opportunities for involving the private sector in ITS deployment, operations, and infrastructure build-out.

Mainstreaming ITS into Planning Process

The plan describes how it represents only an initial step on the path to deploying technologies. However, the plan does not explicitly address how ITS projects should be integrated into statewide or local planning processes.

Operations and Maintenance

The plan includes planning-level estimates of future annual operational and maintenance costs. In addition, the plan recommends that NMSHTD develop a formal Operations and Maintenance Plan for the statewide ITS that outlines maintenance requirements, schedules, policies, responsibilities and costs. The plan also recommended that NMSHTD explore opportunities for shared operations and maintenance agreements with other public agencies as well as private contractors. A Statewide Concept of Operations also was recommended to help MNSHTD develop strategies and procedures for ITS operations.

Other Key Features

Because of the concurrent ITS efforts in Districts Three and Four, the statewide plan had to integrate not only planning efforts but also architecture concepts. This integration pattern may serve as a helpful example for statewide or regional plans in other areas that are striving to integrate with earlier efforts.

Current Status

The New Mexico ITS Strategic Plan was completed and approved by the Steering Committee in November 2000. All NMSHTD funding for ITS deployment will come out of the districts; accordingly, the statewide ITS coordinator is working with the districts to support ITS projects. Districts 3 and 4 are both undertaking ITS projects, and District 6 is beginning to look toward that direction as well. District 3 projects are focused around the Albuquerque Advanced Metropolitan Traffic Management System (AMTMS) and supporting traveler information for the Big-I interchange reconstruction project. Deployed technologies include closed-circuit television (CCTV) cameras, permanent and portable variable message signs (VMS), vehicle detection systems, a spread spectrum radio wireless communications infrastructure, and hardware and software to support a virtual transportation operations center. These were funded primarily through Congressional earmark and Federal congestion management funding. Projects to expand the AMTMS are currently in the design phase. District 4 projects include a transportation operations center in Las Vegas, enhanced roadway closure systems for the interstates, CCTV, highway advisory radio, smart trailers (which include HAR, VMS and drone radar) to support construction work zones, wireless pager activation systems for school zones and animal crossings, and a variable speed warning system near Raton Pass on Interstate 25. The total cost of District 4 ITS investments is approximately $265,000.

Statewide, NMSHTD is pursuing conversion of the state's highway information telephone to "511" through a design-build contract. It is hoped that such a system would be operational by October or November. The state is also pursuing implementation of MIRCIS. Both of these projects were short-term recommendations from the statewide strategic plan.

New Mexico has joined with five other states – Arizona, Colorado, Oklahoma, Texas and Utah – to form a Southwest Regional ITS Integration Team. The purpose of this team is to improve information sharing across state lines, as road closures and travel constrictions in this part of the country often impact adjacent states. This group had its first meeting in December 2000 and is planning to meet annually.

In another integration effort with other states, NMSHTD is developing a statewide Commercial Vehicle Information Systems and Networks (CVISN) plan. Many different organizations, including the Department of Public Safety, the Taxation and Revenue Department, the Federal Highway Administration, the Federal Motor Carrier Safety Administration, the University of New Mexico and New Mexico State University, have partnered in the development of this plan. Memoranda of understanding were developed with the Amarillo and El Paso districts of the Texas Department of Transportation.

Future Activities Planned

The plan includes several recommendations for how the ITS program should proceed. These recommendations include the development of a statewide telecommunications master plan, a statewide operations concept, and an advanced traveler information system (ATIS) business plan. It is also recommended that the strategic plan be updated in five to seven years. Outreach between the statewide ITS coordinator to NMSHTD district staff will continue.

There are no current plans to continue the Steering Committee.

Participating Institutions

Public:	New Mexico State Highway and Transportation Department – project sponsor Bernalillo County City of Las Cruces City of Santa Fe Federal Highway Administration (FHWA) – project sponsor New Mexico Department of Public Safety
Private:	Kimley-Horn Associates

Cost Information

The plan cost $130,000 and was paid for through Federal and state funds.

Statewide ITS Plan	2000-2001 (18 months)	$130,000

Level of Involvement	Cost
NMSHTD Staff (per person)	25-30 hours per week
Steering Committee	Approx. 10 hours per month

Benefits

Creation of the plan provided an overall statewide framework to help district-level initiatives work better together. It helped to increase awareness of ITS throughout the state. While the Steering Committee and outreach efforts introduced ITS to many partners, there have been few formalized agreements between NMSHTD – which is currently providing most of the state's ITS infrastructure and other organizations.

No projects described in the plan have been deployed yet, so no information about benefits is available at this time. The plan recommends that projects should be evaluated as deployed in order to assess to what extent they are meeting user needs. To that extent, the plan includes a list of quantitative and qualitative criteria as well as descriptions of performance measures that may be used in potential evaluations.

The plan budget did not include any funding for project deployment or evaluation.

Lessons Learned

Public-Sector

- The concurrent timing of the regional and statewide efforts was helpful in avoided redundant or superfluous efforts
- NMSHTD found the consultant relationship very helpful in producing the statewide plan.
- It was difficult to attract much interest to the focus group workshops at the outset of the project, due to the lack of knowledge about what ITS is and what it can do

Private-Sector

- As the Steering Committee served to define the vision of the plan, it was important to have members who were receptive to ITS and its benefits
- Close communication between the districts and the state at the outset of the plan provided multiple benefits. First, coordinated planning efforts ensured that few if any ITS devices would be deployed that could not be integrated into the state's broader architecture. Second, early action by some districts would help to get the plan recommendations implemented in other districts

References and Contact Information

Documents Reviewed

1. Kimley-Horn and Associates, *New Mexico ITS Strategic Plan: Final Report*, October 2000.
2. *New Mexico ITS Strategic Plan: Executive Summary*, November 2000.

Contacts

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To view the New Mexico ITS Strategic Plan and ITS Brochure:
http://nmshtd.state.nm.us/traffic/traffic_its/statewidesp.htm

State of New York Rural ITS Deployment Plans

Goals

The New York State Department of Transportation (NYSDOT) has initiated a statewide ITS program called NY MOVES. This program is aimed at improving the public's transportation-related mobility, operations, vehicular systems, environment, and safety through the use of new transportation systems and technologies.

NY MOVES is intended to advance ITS implementation in the upstate and downstate regions of New York, in both rural and urban areas. To accomplish this, NYSDOT initiated planning studies for several large and medium urban areas and for its rural and small urban areas.

This case study focuses on the rural and small urban area planning. This planning study was performed within NYSDOT Regions 2 (Utica), 6 (Hornell), 7 (Watertown), and 9 (Binghamton), and had the following goals:

- To develop a ITS Toolbox of potential ITS solutions that could as a resource for rural and small urban areas throughout the State of New York
- To develop an ITS Strategic Deployment Plan for NYSDOT Region 2, which lays out an approach for the systematic deployment of ITS solutions identified as meeting the specific needs of the Region
- To develop ITS Strategic Deployment Directions for Regions 6, 7, and 9, which provide high-level conceptual plans for the vision, priorities and direction of ITS developments in these Regions

Approach

The ITS toolbox and deployment plans for rural and small urban areas in Regions 2, 6, 7, and 9 was one of a series of studies initiated by NYSDOT, that would ultimately provide complete statewide coverage of the ITS needs and opportunities in New York. This planning study was contracted to a consulting firm. NYSDOT issued a solicitation for the study in January 1997. The consultant was placed under contract in January 1998 and completed the initial project work in June 1999.

Rationale Behind the Project

While significant ITS planning efforts were already underway in other larger metropolitan and urbanized areas throughout the State of New York, NYSDOT recognized that the rural and small urban areas (defined by NYSDOT as those with less than 250,000 total population) may demand different ITS technologies and systems to meet their unique needs. The study, therefore, was undertaken by four of NYSDOT's predominantly rural transportation regions, with Region 2, which is headquartered in Utica, leading the project.

These four Regions were selected because they did not otherwise have a large urban area which was subject to an early deployment planning effort. NYSDOT considered it important to allow each of their transportation Regions to have the opportunity to participate in ITS planning activities. Each of the four Regions was solicited for interest, and all expressed interest. The Director of Region 2 was particularly interested in this opportunity and was able to find significant funding to initiate the planning. The remaining three Regions contributed lower levels of funding to the study.

The initial project was performed in two principal phases. The first involved the development of an ITS toolbox [1], which consists of a series of ITS applications specifically appropriate for deployment in rural and small urban areas. These tools are intended to be currently available and appropriate for meeting mobility, capacity, and safety problems and needs. The toolbox was designed to serve as a standalone technical resource, available to any group or Region in NYSDOT.

The second phase led to the development of a Strategic Deployment Plan for Region 2 and Strategic Directions for each of Regions 6, 7, and 9. These planning efforts undertook to identify the rural/small urban transportation problems and needs of each Region, prioritize these, and develop potential ITS solutions [2]. For Region 2, the planning efforts included the development of detailed proposals for a series of "early winner" and other pilot projects, in a form which could feed directly into the NYSDOT design process [3]. For Regions 6, 7, and 9, the planning efforts included the development of outline proposals for ITS pilot projects, providing sufficient detail for the Regions to seek funding [4, 5, 6]. The difference in level of detail for Region 2 versus Regions 6, 7, and 9 again recognized the greater proportional funding contributed by Region 2.

Approach to developing the Strategic Plans

Each of the four NYSDOT Regions participating in the planning project appointed a Project Manager. A Project Manager was also appointed from the NYSDOT Central Office. Each of the four Regions also established a project Steering Committee. The Steering Committees comprised a broad base of potential stakeholders, drawn from within and outside NYSDOT. The Steering Committee members represented both public and private sector organizations. The following table illustrates typical organizations represented on one or more regional Steering Committee.

?? NYSDOT ?? New York State Patrol ?? Local law enforcement ?? Local emergency services ?? FHWA ?? Cities ?? Counties ?? State legislator staff	?? NYS Rural Development Council ?? Metropolitan planning organizations ?? Local transit operators ?? Private transit operators ?? Native American organizations	?? Chambers of commerce ?? NYS Economic Development ?? Adirondack North Country Association ?? Local attraction operators ?? Local event organizers ?? Corning Glass

The first aspect of the planning study was the development of the ITS toolbox. Since this was intended to be a resource on potential ITS solutions available to users throughout the State, each of the four Regions was engaged in its development. At an initial meeting of each of the Steering Committees, the participating stakeholders were provided an introduction to ITS and were given examples of successful rural and small urban applications from around the country. At the time of these initial meetings, U.S. DOT had developed a "Strategic Plan for Advanced Rural Transportation Systems," which promulgated seven Critical Program Areas (CPAs) for rural ITS, and these were used as the basis of the presentations to the stakeholders.

Following this introductory educational process for the Steering Committee members, the stakeholders were asked to identify transportation problems and needs that may be susceptible to

ITS solutions. To make this process more manageable, three broad application areas were used, rather than the seven CPAs. The application areas were safety, tourism and traveler information, and traffic and transit management. During this process the stakeholders were directed to be a parochial as possible in identifying their problems and needs; focusing on their own agency or organization rather than on the broader group of participants. The intent of this approach was to help gain a deeper understanding of the various diverse stakeholder organizations, several of which were not traditional participants in other transportation planning or development processes. The output of these needs assessments in each of the four Regions provided the basis to identifying the most appropriate ITS "tools" for inclusion in the toolbox, and also served as the initial input to the Strategic Deployment Plan/Directions.

The development of the Strategic Deployment Plan for Region 2 and the Strategic Directions for Regions 6, 7, and 9, brought together the respective Steering Committees on several further occasions. While the depth of the Strategic Deployment Plan for Region 2 was far greater than the Strategic Directions for the other Regions, each of the documents followed a process of using the identified needs in each Region to define ITS opportunities and approaches. From these a "vision" was developed under each of the three application areas (i.e., safety, tourism and traveler information, and traffic and transit management) for each of the four Regions. In turn, these vision statements, together with specific input from the stakeholders, were used to identify and describe various proposed pilot projects. For Region 2, these pilot projects were described in terms of needs, technical approach, and estimated system deployment cost. For the other Regions, the pilot projects included only a conceptual approach.

The ITS toolbox was completed in December 1998. The Strategic Deployment Plan and the Strategic Directions were completed in June 1999.

Contents

Projects and Activities

The Strategic Deployment Plan for Region 2 identified "early winner" projects and proposed pilot projects. The pilot projects included:

- A simple internet-based pre-trip traveler information system for special events
- An integrated mobile traffic management and traveler information system, know as the sak (swiss army knife) trailer (in conjunction with regions 6, 7, and 9)
- Automatic vehicle location and computer-aided dispatching to coordinate the operations of multiple transit providers in the region

The Strategic Directions for Regions 6, 7, and 9 identified the following proposed pilot projects:

- A multi-agency information sharing pilot
- Weather information for traveler safety and security
- A "virtual" traffic management center for traffic monitoring and incident detection

Architecture Issues

At the time of the development of the Strategic Deployment Plan for Region 2, U.S. DOT had issued Interim Guidance on consistency with the National ITS Architecture. The Region 2 planning study followed this guidance, and identified those user services applicable to the identified needs and approaches; developed a simplified high-level logical architecture; and identified specific equipment packages.

The development of a statewide ITS architecture, consistent with the National ITS Architecture, has been proposed by NYSDOT as a follow-on to the initial efforts performed in the planning project.

Institutional Involvement

Each of the reports for the four Regions emphasize the need for keeping the broad multi-agency, public-private stakeholder groups that made up the Steering Committees involved in the future. The reports recommend that NYSDOT take responsibility for encouraging continuing coordination and the exchange of information and ideas, both within NYSDOT and with other stakeholder organizations.

Several of the pilot projects are proposed as partnerships between public agencies (e.g. NYSDOT and the NY State Patrol) or as public-private partnerships (most notably in the area of traveler information systems).

The reports also recognize that NYSDOT may not always be the most appropriate agency to lead a proposed project, but can generally fulfill an important role in bringing together the stakeholders and facilitating project development.

Organizational Issues

As noted above, the reports recommend the continuation of the Steering Committees in the four Regions. It is also recommended that each NYSDOT Region designate an ITS Coordinator, to serve as a resource and point-of-contact for outside agencies and groups.

Outreach, Marketing & Education Activities

The reports include proposals for building ITS awareness, especially addressing the information needs of elected and appointed officials. They also include recommendations that NYSDOT staff receive proper ITS training. The U.S. DOT Professional Capacity Building program is recommended to achieve this.

Funding Opportunities and Sources:

The plans do not identify specific funding sources. However, some of the recommended projects are preceding using State funds allocated through the individual Regions' budgets.

Current Status

The ITS Toolbox for Rural and Small Urban Areas, the Strategic Deployment Plan for Region 2, and the Strategic Directions for Regions 6, 7, and 9 have all been completed and approved by NYSDOT. One of the recommended pilot projects, the SAK Trailer, has been funded and is awaiting execution of a design contract.

Future Activities Planned

A second phase to the initial planning study has been funded and is awaiting contract execution with the consultant. This phase will revisit the toolbox and planning documents with further stakeholder participation (specifically stakeholders from other NYSDOT Regions and from within the NYSDOT Central Office will be solicited); it will develop a statewide systems architecture; and it will develop a conceptual plan for a statewide, multi-agency transportation information systems (modeled after Arizona's Trailmaster or the multi-state condition acquisition and reporting system (CARS) program).

Participating Institutions

The planning initiatives were led by NYSDOT. Other participating public and private sector organizations are identified in the earlier table.

Cost Information

Title	Date	Public Sector Cost	Private Sector Cost
ITS Toolbox for Rural and Small Urban Areas; Strategic Deployment Plan for Region 2; Strategic Directions for Regions 6, 7, and 9	June 1999	*Unknown*	$405,000 consultant contract

Benefits

No specific benefits of the planning initiative are reported.

Lessons Learned

The importance of the broad stakeholder participation has been emphasized by NYSDOT. It is also reported that it is important to maintain this involvement beyond the conclusion of the study, both through continuing meetings of the Steering Committees and by joint participation of agencies and organizations in the resulting design and deployment activities.

NYSDOT also reports that they learned that they may not always be the lead agency in designing and deploying the resulting projects. This is because of the multi-stakeholder approach that was used, whereby other agencies or organizations could promote, and have recognized in the plans, activities that are outside the traditional responsibilities of NYSDOT. In all cases, however, NYSDOT, felt that they had an important role to play in moving forward and facilitating the development of projects represented in the plans, even if they would not have ultimate responsibility for their deployment and operation.

NYSDOT noted the importance of their regionally-based organization in the way they do business and interact with other agencies and organizations. As a consequence, the need for an ITS Coordinator in each of the Regions was identified as key. This individual can serve as a resource within their own organization, and can serve as the point-of-contact to outside groups.

References and Contact Information

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State of Oregon Rural ITS Strategic Plan

Goals

The Oregon Transportation Plan (OTP), prepared in 1992, identified ITS as a key element in its "Preferred Alternatives" for helping achieve the objectives of the future of transportation in Oregon since it provides a variety of tools which will facilitate those objectives. The Oregon Department of Transportation (ODOT) completed its ITS Strategic Plan in October, 1998. Oregon's vision of ITS focuses on using technologies and systems available to improve mobility, efficiency, enhanced transportation safety and productivity. It was envisioned that ITS would address the current and future needs of the transportation system in Oregon. The goals of ITS implementation would be to:

- Improve safety
- Improve efficiency of the transportation system
- Improve mobility and accessibility
- Improve productivity of the users
- Improve intermodal connections
- Promote environmental responsibility and reduce energy use
- Promote economic development in Oregon

The Oregon ITS Strategic Plan states that the purpose for developing the plan "is to identify the specific needs of the State, evaluate the effectiveness of different technologies to meet these needs and the goals of the OTP, develop a coordinated program of deploying suitable ITS technologies and strategies, develop an institutional framework for ITS deployment and operations, and identify policies and legal parameters for successful ITS deployment."

Approach

Rationale Behind the Strategic Plan

The ITS planning process focused on solving local user needs instead of solely identifying new technologies that could be implemented in Oregon. The intent of this plan was to identify the specific needs of the State, evaluate the effectiveness of different technologies to meet these needs and the goals of the OTP, develop a coordinated program of deploying suitable ITS technologies and strategies, develop an institutional framework for ITS deployment and operations, and to identify the necessary policies and legal parameters for successful ITS deployment.

In order to accomplish these intents, the planning process focused on three areas:

- ***Outreach.*** The planning process was to reach out to stakeholders from all sectors and geographical areas, providing information as well as allowing opportunity for input
- ***Consensus.*** The planning process was to develop consensus on an action plan for ITS that would supports the goals and objectives
- Partnerships. The process was to build partnerships that would foster ITS deployment

The ODOT ITS Strategic Planning Process identified and prioritized "what" the agencies were interested in deploying. A subsequent planning effort is currently underway to develop a deployment plan. The intent of this deployment plan is to define more specific details of how the

deployments will be accomplished. In this specific partnerships will be defined. The strategic plan identified the potential for several partnerships, but did not define specific details of roles.

Organizational Approach

The Oregon ITS strategic planning process was led by ODOT's Transportation Development Branch. A consultant was hired to perform the study, and a Technical Committee and Steering Committee were formed to guide the planning process.

The Technical Committee members included:

ODOT Motor Carrier Branch
ODOT Information Systems Branch
ODOT Region 1
FHWA, Region 10
Department of Administrative Services
Caltrans, New Technology and Research Program
ODOT Technical Services Branch
ODOT Rail Services
ODOT District 10
TRI-MET (regional transit authority)
Washington State DOT
Oregon State University

The Steering Committee members included a mix of personnel public and private agencies from:

Polk County Commission
Oregon State Police
ODOT
City of Medford
UPS, Industrial Engineering
May Trucking Company
Caltrans, New Technology and Research Program
City of Portland
METRO
City of Seaside
Harney County, Former Commissioner
Port of Portland
TRI-MET
FHWA
Washington State DOT

In addition to the Steering and Technical Committees, a Policy Committee was established to oversee the strategic development of the project. This committee consisted of the ODOT Director along with a State Senator, Executive Department official, a Transportation Commissioner and a member of the business community. The Policy Committee considered the overall impact of the project and how the direction of the project would affect other parts of the state government, areas of the state and the public.

Four key workshops were conducted with Committee members. These workshops were conducted during the course of developing the Strategic Plan, as each individual component was reached in the schedule.

These workshops included:

- A two-day User Services Prioritization Workshop
- A Market Packages Workshop
- Institutional Issues Workshop
- An ITS Plan Elements Workshop

Approach to Developing the Strategic Plan

The Oregon ITS Strategic Plan was developed following the general framework established by the Federal Highway Administration, with some tailoring for the needs of Oregon. The process was undertaken with a strong emphasis on user-needs and a strong coalition of institutions. It was deemed that this coalition would be essential in insuring that each agency's needs, constraints, opportunities and responsibilities are addressed, and that the resulting plan met the needs and expectations of end users.

ODOT undertook several major steps in completing the Oregon ITS Strategic Plan. These steps are identified below, followed by a more detailed explanation of some of these major steps:

- Inventory of Existing and Planned ITS Infrastructure
- Defining the Problems and Needs
- Prioritization of User Services
- Develop an ITS Market Package Plan
- Screen Technology Options
- Identify Early Winners
- Develop ITS Operation Plan

Identifying the Needs and Inventorying Existing Infrastructure

The initial two tasks of the planning process defined the needs that could be addressed by ITS and documented the existing and planned ITS infrastructure. The documentation of infrastructure was conducted through an 81-person telephone survey, which allowed participants to describe the existing and needed ITS infrastructure. As a result, a table was comprised to summarize what ITS infrastructure was existing, planned and desired in each area of the state.

In defining the needs, a User Service Workshop was conducted. This workshop also served to define the vision statement and goals/objectives that would guide the remaining planning process. The portion of this workshop dedicated to needs definition allowed each participant to rank the severity of various problem areas for the highway system, transit system and commercial vehicles on a scale of 1-5. The needs identified by Workshop attendees were compared with the feedback obtained through the telephone surveys.

Prioritizing the ITS User Services

On the second day of the workshop, participants were allowed to rate how well the 29 ITS user services addressed the eight individual goals developed for ITS in Oregon. This rating was done by allowing attendees to rate how well each user service addresses each goal on a scale of 1-5 (1=does not address goal, 5= addresses the goal in the best possible way). In addition, attendees rated the priority of each individual user service on a scale of 0-5.

As a result of these exercises, priorities were assigned to each user service. Also, by assigning weights to each goal (based upon importance), goal weighted scores were computed for each user service. As a result ten user services were selected to be highest priority for Oregon's ITS plan.

Selecting ITS Market Packages

The ten highest priority user services were then used to identify the market package list for Oregon. Attendees at the Market Package Workshop were then presented with candidate ITS applications for each market package. Each Technical Committee member was given a total of 56 dot stickers (each sticker viewed as a million dollars) and asked to allocate the stickers (as

though they were funding) to the ITS applications viewed as top priority. As a result of this exercise, the ITS Market Packages and individual applications were prioritized.

Evaluation of Technologies

A series of technology applications were reviewed and considered for deployment in Oregon. For each technology, the Strategic Plan defined the purpose of the technology, the application in Oregon, the deployment criteria, the unit costs and candidate deployment areas.

Operational Plan

Following the recommendations for technologies to be deployed, the ODOT Strategic Plan identified operational plans that outlined the capital, operations and maintenance, and staffing costs for short-term recommended projects in each area of the state.

Contents

Projects and Activities

The ODOT Strategic Plan identified 30 short, medium and long term ITS activities for the 5 major regions in the State, in addition to statewide implementations.

One Portland Region example project is that of a Transit Location/Information System. This project provides real-time location information to dispatch and travelers through signs and kiosks.

A Salem Region example project is the installation of a Photo Violation Detection System. This system would use photo radar to capture violators around cities in the region.

A Medford Region example project would be an Automatic Incident Detection System. This system would monitor traffic volume flow and alert the appropriate agency of an incident which would require emergency response to assist.

A Bend Region example project is a Local Traveler Information Database. This system would compile traffic, incident, weather and roadway information and other traveler information for dissemination to travelers.

A LaGrande Region example project is Icy Bridge Warning Signs. These signs would be triggered by temperature sensors embedded in the bridge, alerting drivers of the driving conditions on the bridge.

Architectural Issues

ODOT used the structure of the National Architecture as defined within the FHWA Strategies, as well as in documentation provided by ITS America. This allowed the project to stay within the guidelines of the federal mandate for developing an ITS Strategic Plan.

The Oregon ITS Strategic Plan incorporated several components of the National Architecture during its development. Documentation of local user needs in the User Service Plan was included in the process and contained a description of each of the 29 ITS user services. A workshop was held to identify the needs and resulted in five main categories, (1) System Utilization Needs, (2) Travel Delay Needs, (3) Traveler Information Needs, (4) Environmental Needs and (5) Safety, Security and Regulatory Needs. Prioritization of the 29 ITS user services was then performed to identify how well each addressed the eight goals for ITS in Oregon.

The results of the ITS Users Services Plan were used to identify the top ten user services in Oregon. These 10 user services were then re-grouped to form market packages that were

evaluated and used to generate a list of ITS infrastructure that would be viewed as most needed in Oregon. To implement these market packages, a series of ITS Elements (such as Variable Message Signs, Kiosks, Icy Bridge Warning Signs and Adaptive Traffic Signal Systems) were identified as necessary for Oregon. The process then involved outlining the ITS Elements that would serve the needs of each of the 5 regions and documenting the quantity and general location where these ITS Elements are needed.

The Oregon ITS Strategic Plan did not involve the development of a logical, or physical architecture, nor did it establish architecture and data flows. At the time of developing the strategic plan, it was determine that this effort would not be effective, but that the development of architecture at a later date would be prudent.

Institutional Involvement

ODOT placed significant efforts towards ensuring that various branches within ODOT, as well as outside agencies were able to participate, thus obtaining their buy-in and making the success of the project easier. This project was used as a catalyst for developing a specialized group within ODOT to specifically look at ITS deployments across the state. The Policy Committee guided the overall strategic direction of the project and was the group who would generate the support for ITS within other state government agencies and the legislature. The Steering Committee and Technical Committee then used this strategic direction guidance to ensure that the project considered aspects which may influence other parts of the state, agencies and their work, and the general public.

Washington DOT and CalTrans were active participants in the project to establish regional interest in the project, generate economies of scale and ensure that efforts with border (and partner) states are maximized.

In order to have the ITS Strategic Plan implemented, the approval of the Oregon Transportation Commission was needed so that it could be incorporated into the State Transportation Improvement Plan (STIP). From there, Regional ITS Plans could be developed that would be incorporated into the Regional Transportation Plans (RTPs) of MPOs around the state and also into the STIP.

Some private partners identified include telecommunications companies for shared resources of fiber connections and cellular communications for traveler safety. Commercial vehicle operators could provide real-time traffic information by acting as probes in the traffic stream and cable TV companies could assist in distributing traveler information.

Organizational Issues

A Policy Committee was established to oversee the strategic development of the project. This committee consisted of the ODOT Director along with a State Senator, Executive Department official, a Transportation Commissioner and a member of the business community. The Policy Committee considered the overall impact of the project and how the direction of the project would affect other parts of the state government, areas of the state and the public. This committee provided guidance and feedback to the Steering Committee regarding the overall direction of the ITS Strategic Plan.

The Steering Committee members included a mix of personnel public and private agencies from various city governments, private sector firms, ODOT and adjacent State DOTs. This committee used the feedback from the Policy Committee to provide guidance to the Technical Committee regarding the technical direction and areas of focus of the ITS Strategic Plan. The Technical

Committee members consisted mainly of ODOT departments, along with FHWA, Washington DOT and Caltrans officials. This committee dealt with the technical issues and was involved in the detailed development of the Oregon ITS Strategic Plan.

A list of the participant agencies in the ITS Strategic Plan is provided in the Organizational Approach section.

Outreach, Marketing & Education Activities

During this planning effort and since its completion, ODOT has conducted several outreach efforts to target transportation professionals around the state. These outreach efforts have primarily been through presentations to various groups such as the League of Counties, at conferences and as new projects require outreach and education to ITS for participants. In addition, the ODOT website and the newsletters contain information about on-going ITS efforts within the state. These efforts have increased knowledge and interest in ITS.

Funding Opportunities and Sources

The plan does not identify specific funding sources, however the typical sources are always being investigated. This includes obtaining earmark funding for projects, TEA-21 or NEXTEA funding and ensuring that ITS is included within the STIP and RTP. Additionally, funding requirements include stipulations for local matches of funding which may come from local agencies as well as from specific ODOT divisions interested in certain projects or activities.

Other Key Features

The ITS Strategic Plan was developed to be flexible to allow regions and agencies to refine the ITS design to suit their geographical and regional needs. This effort included the recommendation for five "Sub-regional ITS Implementation Plans", one for each of the five ODOT regions.

Current Status and Future Activities

The ITS Strategic Plan has been approved by the Transportation Commission, of which members are appointed by the Governor of Oregon and includes officers from local cities, counties, private sector and other agencies. The approval by the Transportation Commission is seen as an important step in moving ITS forward in the state. It is not known whether local agencies and MPOs have specifically approved the Oregon ITS Strategic Plan.

ODOT is currently performing an ITS Deployment Planning study. This study will define how these prioritized activities will be deployed. Details of partnership relationships, locations, and funding sources will also be defined. This next phase of deployment planning is expected to be completed in the Spring of 2001. Current projects being deployed include:

- CCTV cameras (approximately 90 at present time) across the state, in both urban and rural areas
- VMS deployments in rural areas
- Urban TMC and ramp metering in the Portland area
- Advanced Traveler Information Systems using the ODOT and TripCheck websites for dissemination of information, including CCTV camera images and weather station information

Future projects being considered include:

- Further enhancements and outward planning of the TripCheck website
- Adding more CCTV cameras in the Portland area
- TMOC development for the Portland area
- Investigating new technologies such as animal-vehicle collision avoidance systems and vehicle/travel speed subsystems

There is no formal group or agency relationship has continued to operate since the initial planning process. Many of the agencies however do continue to interact, but more so on a project-by-project basis. Many of the users in the ITS projects established within the Strategic Plan involve local participants not directly involved in the initial planning process and therefore many new users are being brought into the fold of ITS planning within Oregon.

Participating Institutions

The planning initiatives were led by ODOT. The private sector consultant on the project was DKS And Associates. Other agencies involved included: FHWA, Oregon State Police, Tri-Met, Caltrans, Washington State DOT, and the Cities of Portland and Medford.

Cost Information

The consultant contract was valued at approximately $150,000. In addition, the Policy, Steering and Technical Committees met several times to discuss the project and meet with the consultants to provide guidance or make decisions regarding the direction of the project. Approximately 800 person-hours were used to undertake those tasks by the various committees. The ODOT project manager was dedicated approximately 35% to the project for a full year and had approximately 520 hours of support staff time (10 hours per week) throughout the project. As a result of the various Committee members having some experience with ITS prior to commencement of the project, it was felt that this benefited the project by reducing the learning curve and enabling for decision making to be able to be performed more quickly and efficiently.

Benefits

The project was started before ODOT had established a branch/group to work specifically in the area of ITS and as a result of the scope of work a dedicated branch was established to focus on the needs of ITS deployment in Oregon. This is viewed as a very important benefit that resulted from the development of the ITS Strategic Plan.

Within Oregon, a shared resource procurement during the ITS planning process allowed for significant cost savings by providing fiber and enable for data communications to be established. Additionally, the COATS project, which is an interagency project with Caltrans and ODOT, allows for shared investment and economies of scale in the deployment of ITS technologies.

Lessons Learned

The largest lesson learned is that the strategic planning effort is really just the beginning of the process towards deploying ITS technologies. Many of the participants of the planning effort become much more enthusiastic and able to discuss details when the actual projects are defined, scoped, funded and ongoing.

Specific lessons that were learned during the ITS planning process include:

- Planning ahead for maintenance and the resources needed to maintain the ITS infrastructure is very important toward protecting the initial investment
- Obtaining the support of the head of the agency can significantly increase the effectiveness and promotion of ITS within the state to garner support within all branches of state government
- Ensuring that all branches of DOT are involved in the planning process, as well as ensuring that regions/districts and maintenance personnel are involved to be sure that support at the base level is obtained for ITS
- As one of the first states to push rural ITS, many lessons regarding placement of equipment and communications with the rural equipment must be closely examined to ensure that all considerations are accounted for, however standards and interoperability development will make these efforts easier for states deploying equipment in rural areas now
- Software development costs, both time and money, should not be underestimated
- Communication costs are large compared to the cost of the equipment and should be carefully scrutinized

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ITS Strategic Plan for Washington State: VENTURE Washington

Goals

The plan establishes the following goals and objectives for Washington's intelligent transportation systems (ITS)1 program:

Goal	Objective
Decrease Congestion	3. Reduce Recurring Congestion 4. Reduce Non-Recurring Congestion
Increase Alternate Mode Share	1. Increase Attractiveness of Alternate Modes
Improve Highway Safety	1. Reduce Accident Rate on Arterials 2. Reduce Accident Rate on Rural Highways 3. Reduce Accident Rate on Freeways 4. Avoid Secondary Accidents 5. Improve Emergency Response
Facilitate Efficient Goods Movement	1. Improve Efficiency of Trucking Operations 2. Reduce Time for Goods Movements 3. Improve Intermodal Connections
Support Tourism	1. Increase Awareness of Tourist Attractions (i.e. where to go) 2. Improve Tourist Mobility (i.e. how to get there)
Improve Environment	1. Reduce Emissions 2. Reduce Energy Consumption 3. Support Growth Management Policies
Enhance Existing Systems Operations	1. Improve Information 2. Interagency Coordination 3. Increase Productivity of Agency Staffs

These generic goals were translated into a series of ITS strategies, which include:

- Reduce traffic turbulence (i.e. Speed fluctuation)
- Enhance incident detection, verification, and response
- Improve coverage and quality of data collection
- Coordinate freeway and arterial traffic management
- Provide traveler information
- Support traveler safety measures
- Support transportation demand management (TDM) programs
- Improve high-occupancy vehicle (HOV) efficiency and effectiveness
- Increase fleet efficiency/performance
- Improve intermodal connections
- Enhance pricing strategies
- Support actions to reduce emissions and energy use
- Reduce interagency barriers

These strategies were mapped to a set of ITS techniques, as shown in Exhibit 1, presented at the end of this Case Study.

1 Although the document was created when IVHS was the predominant term, ITS will be used throughout the write-up for consistency with documentation of other plans. IVHS will be mentioned as an acronym only when relevant.

Approach

Organizational Approach

By the early 1990s, Washington State had achieved a position on the leading edge of deploying ITS technologies, especially in metropolitan Seattle, largely through aggressively pursuing and winning Federal funds for demonstration projects. Projects were pursued largely for perceived benefit and without necessarily fitting into a larger vision. It was the desire of both transportation officials and the State Legislature to have a strategic vision for how these technologies should be pursued. (The Legislature wanted to ensure that spending the state match on these projects was justified in that these projects fit into a larger context.)

To provide this larger context, WSDOT initiated a strategic planning effort in 1992. Funding for development of the strategic plan was provided by WSDOT.

To provide guidance for the project, a resource group of approximately 50 individuals, primarily from WSDOT but with representation from cities and counties as well, was assembled. Among this team, experience and familiarity with ITS was generally limited. Consequently, a handful of people within WSDOT's Advanced Technology Branch provided more direct, day-to-day guidance to the project team.

The consultant-led study team conducted the study under the auspices of WSDOT's Urban Systems Branch (which is now the Advanced Technology Branch).

Technical Approach

WSDOT employed a consultant team for developing the strategic plan, as very little work had been done in ITS planning prior to this effort. The consultant's technical approach included the following steps:

- Review transportation visions and policy plans at Federal, State and regional levels
- Develop transportation strategies from broader goals and objectives
- Identify ITS techniques that may be applied to each strategy
- Group ITS programs into "user services" and regions
- Evaluate the merit of ITS projects by region
- Document available funding sources and strategies
- Describe supporting actions which must be taken to create an environment conducive to ITS, including partnerships, ITS program organizational structure, and public information and marketing
- Describe actions that will need to be taken to accommodate operations and maintenance of the ITS program

One unique aspect of this strategic plan is its emphasis on regional deployment. The project team divided the State into five "regions": Central Puget Sound (includes Seattle and Tacoma), Spokane, Vancouver (because it is across the Columbia River from Portland, Oregon), Other Urban Areas (cities with populations greater than 50,000), and Intercity/Rural. This was done in order to demonstrate that ITS had applicability in all parts of the state, and not just in metropolitan Seattle, which had much of the state's ITS infrastructure at that time.

Contents

The final report for the strategic planning effort presents ITS alternatives in the context of broader statewide and regional transportation goals. Candidate technologies are described and evaluated on perceived merit and estimated benefit-cost ratios. The plan compares the total costs of the recommended ITS program with available funding levels. The plan then discusses how public/private partnerships may bridge the gap between these two levels. The plan also reviews elements critical to the long-term sustenance of the ITS program: organizational structure, marketing and public information, and operations and maintenance. A separate volume of appendices provides greater detail, including an action plan by region, divided into near, mid and long-term projects.

Top Needs and Priorities

The statewide plan evaluated and prioritized ITS user service projects on the basis of the five regions. User services with the highest evaluation rankings in each region are:

Central Puget Sound
- Traffic Control
- Trip Planning – Pre-Trip
- Trip Planning – En-Route
- Incident Detection and Management
- Freeway Ramp Metering
- Road Use (Congestion) Pricing
- TDM Support

Spokane
- Traffic Control
- Trip Planning – En-Route
- Trip Planning – Pre-Trip
- Incident Detection and Management
- Freeway Ramp Metering

Vancouver
- Traffic Control
- Trip Planning – Pre-Trip
- Trip Planning – En-Route
- Incident Detection and Management
- Freeway Ramp Metering

Other Urban Areas
- Traffic Control
- Trip Planning – Pre-Trip
- Incident Detection and Management
- Freeway Ramp Metering
- Transit Vehicle Management

Intercity/Rural
- Incident Detection and Management
- Trip Guidance – En-Route
- Regulatory Support – Borders
- Trip Planning – Pre-Trip
- Mayday

Appendix A – Case Studies

- Transit Vehicle Management

Near-term, mid-term and long-term projects were identified for each region, classified according to five ITS program areas: public transit/TDM, traveler information, traffic management, freight and fleet management, and additional services. Examples of near-term projects are shown in Exhibit 2.

Architecture Issues

The plan pre-dates the development of a National Architecture, and consequently does not include its own ITS architecture. The plan discusses standards development activities as well as common infrastructure elements (surveillance, communications, and data processing) that could support many technologies, which both reflect some of the benefits that may be obtained from a system architecture.

As the plan has proceeded since its adoption in 1993, architecture development efforts have occurred at many levels. The first ITS corridor study following the strategic plan, the Seattle to Portland corridor, included an intercity communications plan that was foundational for other corridor plans to follow. As metropolitan planning organizations (MPOs) and counties incorporate ITS projects in their short-term programs, these agencies are developing ITS architectures to accommodate these and future projects. Examples of lead agencies in architecture development include Spokane's MPO, Puget Sound Regional Council (PSRC), Thurston County and Clark County. ITS projects in smaller towns will generate ITS architectures as required. WSDOT is typically a funding partner for these architecture development efforts.

Regional architectures are being developed in conformity with the National Architecture. The PSRC architecture, for example, will include:

- An inventory of subsystems, terminators and flows among agencies and organizations
- Transportation needs mapped to user services to the level of user service requirements, with some customization as needed
- A regional "sausage diagram", identifying principal subsystems and terminators necessary to satisfy user service requirements
- High-level views of the physical architecture in terms of transportation, institutions and communications
- An assessment of the need for operational requirements and agreements, technology agreements, and determination of phasing requirements
- The development of a detailed regional transit its architecture, focusing on operations, subsystem requirements, integration needs, and a framework to support compatibility

There are currently no plans for a statewide architecture. This may occur after all of the State's 14 MPOs and Regional Transportation Planning Organizations (RTPOs) adopt their own architectures. Their architecture development processes may be coordinated through their quarterly meetings.

Institutional Involvement

Initial institutional involvement was fairly limited and proved to be of little constructive benefit to the development of the plan. The primary reason for the lack of useful participation is that most non-DOT stakeholders had no familiarity with IVHS, and associated it primarily with automated highway systems or advanced vehicle control systems. The broad number of agencies

involved in the resource group helped to educate a variety of institutions across the state as to the potential benefits of ITS, laying the groundwork for future institutional cooperation.

Additional institutional involvement was garnered as projects conceived in the strategic plan proceeded toward deployment. This was done by demonstrating benefits to key stakeholders and obtaining funding (especially through field operational tests) to be able to put together projects with minimal commitment from partners.

Private-sector involvement was anticipated for manufacturing and supplying technologies, as well as for supporting several user services, including employer-based TDM initiatives, dynamic ridesharing, traffic control and emergency service management. To foster private-sector involvement, the plan devotes a chapter to describing various public-private partnership models, and the elements that are essential to developing these partnerships successfully.

From academia, the University of Washington served two roles in the development of the Strategic Plan: as a member of the resource group, and as a vital research partner with WSDOT (and Washington State University) through the Washington State Transportation Center. A continued role for academia was anticipated, through researching potential ITS applications and their effects.

Organizational Issues

The resource group was formed in 1992 to direct and review the ITS strategic plan development. The majority of members of the resource group were from WSDOT, with a broad spectrum of districts and headquarters divisions represented. The resource group also included representation from cities, counties, transit agencies, regional councils, Washington State Patrol, Federal Highway Administration, the Transportation Improvement Board (a state agency that administers state funding for local transportation projects), the Legislative Transportation Commission, the University of Washington, transportation management associations, and private organizations. The stated responsibility of the resource group was "to provide multi-modal, multi-jurisdictional guidance for identifying, evaluating, testing, selecting, and implementing appropriate IVHS technologies." However, because IVHS was a relatively new term that many people associated with advanced vehicle control systems, much time in resource group meetings was devoted to the consultant team educating group members about the potential benefits and challenges of ITS. Consequently, this group's role was limited more toward receiving and reviewing project deliverables and providing feedback.

A smaller group within the resource group represented an ad hoc Steering Committee that worked more closely with the consultant on a day-to-day basis.

Most agencies did not show significant interest in the plan until funds were made available through DOT-organized field operational tests. This allowed agencies to test ITS on an incremental, low-risk basis, and has subsequently generated champions in non-DOT agencies, including transit agencies and metropolitan planning organizations.

The plan recommended expansion of the resource group's membership to include more private-sector participation, such as from major employers and manufacturers. Private-sector participation was anticipated for several user services, including the traveler information database, pre-trip trip planning, vehicle monitoring and warning, emergency service management, traveler safety and security, and various freight/ fleet management activities.

A questionnaire was distributed to resource group members during the development of the plan to solicit input on the existing ITS organizational structure, to review merits and areas needing improvement. This input contributed to the development of near-term and long-term visions for the organizational structure of WSDOT's ITS program. These phases were intended to establish a structure to deal with future ITS applications in the State.

Outreach, Marketing & Education Activities

The resource group was the primary avenue for outreach and education. Additional outreach included a twelve-minute video on the ITS Strategic Plan, some presentations to other agencies, and the production of several brochures explaining the planning process.

The plan includes a chapter that recommends marketing strategies to gain public understanding and acceptance of the strategic plan, and to ensure a continual allocation of necessary funding of plan initiatives. Strategies are mapped to different organizations, as shown in Table, with higher values indicating that a particular marketing strategy would be more important.

Funding Opportunities and Sources

The plan establishes program costs for ITS by both region and WSDOT district. The total cost of the ITS program in 1993 dollars is $1.4 billion, with estimated operations and maintenance costs of $142 million per year.

The plan reviews various public-sector program categories at the Federal, State and local levels which provide opportunities for ITS funding[2]. For each source, the plan summarizes the total amount of funding provided through a given source, and the expected funding level that could be obtained by WSDOT's ITS program through that source.

Identified Federal sources all flowed out of the Intermodal Surface Transportation Efficiency Act, which was passed in1991. These sources include: IVHS funding, under ISTEA Title VI, Research; National Highway System (NHS) funding, under ISTEA Section 1006; Surface Transportation Program (STP) funding, under ISTEA Section 1007; Congestion Mitigation and Air Quality (CMAQ) program funding, under ISTEA Section 1008; and Federal Transit Act funds. Other sources are listed in the report, although these sources were expected to be incapable of providing any funding for ITS in Washington. State funds identified by the plan include the motor vehicle fund (gas tax) and the transportation fund (funded by a surcharge on vehicle excise taxes). Local sales taxes and vehicle excise taxes were identified as additional potential sources of funding. Funding sources were mapped to the ITS program category against which they could be applied: construction/reconstruction, operations, maintenance, planning and engineering, and research and development. Several concepts for increasing state-level ITS revenues, through congestion pricing, licensing fees, and other measures were also discussed.

Private-sector funding, such as through advertising to support the traveler information program element, and cooperative ventures, to support applied research and development, is also reviewed, although no level of anticipated funding is provided.

The opportunity to use individual funding sources on each of the program applications (public transit, traveler information, traffic management, freight/fleet management, and other services) is also shown.

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2 The date of the plan means that many funding sources identified at that time may no longer be available.

The plan estimates that the sum of available funding from Federal, State and local sources amounts to $22 million per year. For each funding source, the plan denotes how applicable funds from that source would be to each ITS program application. One unique funding source for Washington's ITS program was the selection of Seattle as one of four Metropolitan Model Deployment Initiative sites.

Based on the gap between available funding and program needs, the plan has a chapter that reviews public/private partnerships.

Mainstreaming ITS into Planning Process

WSDOT's regional and headquarters programming offices used the plan's project descriptions to evaluate projects for programming. The descriptions included a statement of need, a description of the project and an estimate of benefits and costs.

Since the regions cited in the plan did not map to WSDOT's regional structure for programming, a subsequent series of early deployment corridor studies was used to better define projects consistent with WSDOT regional boundaries. These corridor studies included:

- Interstate 5 from Seattle to Portland
- Interstate 5 from Seattle to Vancouver [Canada]
- Interstate 90 from Seattle to Spokane
- Interstate 84 from Portland to Boise, along with State Route 14 and Interstate 82 in Washington State (in partnership with Oregon Department of Transportation and the Idaho Transportation Department)

These studies resulted in project definitions that could be incorporated into regional programs. They were intended to produce real, implementable, "early-winner" projects that could help to demonstrate the benefits of ITS. The corridor studies were funded separately using federal ITS Early Deployment Planning grants. The corridor studies took the strategic recommendations of the Statewide ITS plan and used them as the starting point in the development of specific project descriptions. For example, the Statewide ITS Strategic Plan recommended a focus on traveler information in the Central Puget Sound region, so the Seattle to Portland Corridor study recommended a project to develop a regional, multi-modal traveler information center in the Puget Sound area. This project eventually became SmartTrek, Washington State's Model Deployment Initiative project. Many other projects included in these corridor plans are being implemented, with a combination of state and Federal funds.

WSDOT's Advanced Technology Branch, which has oversight of the ITS program, has been responsible for coordinating projects which overlap multiple programming regions. Regional efforts were in turn rolled into the overall state transportation program.

Operations and Maintenance

The plan estimated the annual costs of operations and maintenance at approximately 10 percent of initial capital cost, which was consistent with assumptions developed by IVHS America at that time.

A chapter of the final plan is devoted to reviewing operations and maintenance issues. Regarding operations, the plan describes typical activities of an advanced traffic management system, and coordination activities that need to occur between participating agencies. Position descriptions are also developed for the staff that would be needed to support operations, although the cost of

staff is not linked to deployment levels. To address maintenance concerns, the plan provides some broad recommendations for implementing a successful maintenance program.

Current Status

The current status of Washington's ITS program was well summarized in a Congressional hearing in August 1999. To review, the statewide strategic plan was completed in November 1993. The strategic plan was presented to the State Transportation Commission after it was completed. In 1996, the Commission approved a Policy on the Application of Advanced Transportation Technology with Washington State. A six-year action plan followed the development of the strategic plan. This action plan was appended to that policy and, therefore, could be considered approved when the policy was adopted. No similar plans are being pursued at this time because ITS is perceived to be too dynamic to be able to develop such a longer-view, large-scale plan.

The corridor studies, described under "Mainstreaming," served as important vehicles for programming ITS projects in each region; now, all WSDOT regions have ITS projects. The most visible example of implemented ITS projects is the Model Deployment Initiative, SmartTrek, based in Seattle. This project resulted in the implementation of several projects, some of which are shown in the following table.

Project	Capital Cost (000's)	Recurring Cost (000's)	Lead Agency
WSDOT Web Site	$85	$294	WSDOT
Cable Television "Traffic TV"	$319	$122	University of Washington
Transit AVL System Upgrade	$1,170	$138	Metro Seattle
Etak/Metro Networks ISP Services	$124	$92	Metro Networks
Washington State Ferries ATIS	$777	$67	Washington State Ferries
Bellevue ATMS	$1,077	$93	City of Bellevue
Regional Video System	$340	$10	WSDOT (provides feed to TV stations)
Improved Incident Video from Incident Response Vehicles	$41	$0.5	WSDOT
Emergency Operations Center Communications Upgrades	$152	$3	Local EOCs
Seattle Center Parking Information System	$925	$51	Seattle Center
Dynamic Ridematch/Rideshare	$173	$13	Greater Redmond Transportation Management Association

Projects have been implemented in other parts of the state, such as the Variable Speed Limit Project at Snoqualmie Pass, some changeable message signs in Spokane, real-time train arrival information for Amtrak trains in the Eugene, Oregon to Vancouver, Canada corridor, CVISN weigh-in-motion sites, and tourist information for motorists on the Olympic Peninsula.

WSDOT's success in winning earmarks, which were helpful for many earlier ITS projects, has been declining in recent years. Earmarks are still seen as critical for rural funding.

Coordination of ITS programs across the state is pursued through a couple of groups. First, MPOs and RTPOs meet on a quarterly basis, as described earlier. Second, a Northwest Freeway Operations Group was established in 1997 between five of WSDOT's six Traffic Management regions, British Columbia and Oregon Department of Transportation's Region 1 (Portland). The purpose of this group, which meets twice annually, is to share lessons learned. This serves as an important vehicle for coordinating ITS on a larger level.

Future Activities Planned

Significant mainstreaming of ITS into the state's transportation program has already occurred, and institutional involvement has been successfully engaged in different parts of the state. All of WSDOT's regions have ITS implementation plans completed or underway. WSDOT is also promoting the addition of ITS elements in regional transportation plans. There are no current plans to institute a follow-up statewide strategic plan.

The Advanced Technology Branch will be promoting the development of regional ITS architectures among the fourteen MPOs and RTPOs. WSDOT will likely produce an "umbrella" ITS architecture that will cover statewide ITS programs like Commercial Vehicle Information Systems and Networks (CVISN). There are no other plans to produce a statewide architecture.

Coordination between WSDOT regions and neighboring states is continuous and on-going even though no formal effort is underway.

Participating Institutions

Public:	Washington State Department of Transportation – project sponsor Washington State Patrol Cities of Bellevue, Everett, Lynnwood, Seattle, Tacoma King, Pierce and Snohomish Counties Community Transit Kitsap Transit Metro Transit Pierce Transit Federal Highway Administration Transportation Improvement Board Legislative Transportation Commission Puget Sound Regional Council Spokane Regional Council
Private:	JHK & Associates (now known as TransCore) – prime contractor Transportation Management Associations Other Private Organizations
Academic:	University of Washington, Washington State Transportation Center (TRAC) University of Washington, Innovations Unit

Cost Information

The initial strategic plan cost $500,000, with funding provided by State funds. Initially, the plan's goal was to include projects in each of the five regions; however, resources were not adequate to do this. The plan did not include any funding for deployment.

Title	Time	Contractor Cost
Statewide ITS Plan	1992 – 1993 (12 months)	$500,000
Corridor Study (I-5 & I-90)	1994 –1997 (30 months)	$500,000

Level of Involvement	Time Commitment
WSDOT Staff	20 hours per week
Resource Group	~5 hours per month per person

Benefits

To obtain funding through WSDOT's Mobility Program, ITS projects must have benefits in reduced delay and/or improved safety. Consequently, estimation of benefits was a significant component of the strategic plan. Benefits were estimated based on findings from recent field operational tests and established projects. Benefits evaluated by the project team included: reduction in delay (both recurrent and non-recurrent), reduction in accidents, reduction in fuel consumption (related to delay reduction), and reduction in management and operations costs (independent of delay reduction). For commercial vehicle operations, other benefits included reduced congestion and shipment delays, improved flow of intermodal and international freight, increased infrastructure capacity, accident reduction, delay reduction, increased revenues (from citations), and increased compliance. Most of the federally funded projects have an evaluation component, such as the Model Deployment Initiative. Many of these evaluations are complete and published by FHWA or the Washington State Transportation Center.

Having the plan showed that WSDOT's ITS program had some direction and that it was not applying for funds simply because an opportunity was there or because there was an interesting technology to demonstrate. Many, if not most of the projects, that were proposed in the Strategic Plan have been implemented. Some of the major benefits of the statewide plan include:

- Installation of traffic management systems and centers in Tacoma, Spokane and Vancouver
- Implementation of a system to allow the exchange of traffic signal system data between jurisdictions within the Puget Sound area
- The Model Deployment Initiative, which increased awareness across the state of the benefits of providing traveler information, regardless of whether it is for urban environments, mountain passes, or ferry terminals
- The Weather project, which provides statewide road and weather information
- The development of a rural ITS program, starting with a variable speed limit project at Snoqualmie Pass and the continuing with the installation of a winter travel center in that vicinity
- Current CVISN and border crossing projects for commercial vehicles

Completing these initiatives required significant numbers of partnerships, agreements and memoranda of understanding.

Lessons Learned

- Most non-DOT agencies do not get involved in ITS until real projects are created with resources provided. If the agencies see the benefits, they will then be willing to ante up resources to sustain the project and initiate new projects.
- This strategic plan was innovative at the time in that it was needs focused, rather than technology-focused. This approach made the plan's recommendations more amenable to ITS architecture development in subsequent years.
- Using a location-based approach allowed WSDOT to focus some attention on rural ITS applications and on applications other than congestion relief. This helped to sell ITS to a broader range of stakeholders.
- Rolling ITS elements into highway reconstruction or rehabilitation projects facilitates mainstreaming of traffic management-related ITS projects, as it will represent a small portion of overall project cost.

References and Contact Information

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2. JHK & Associates, Charles River Associates, Weslin Consulting Services, Infrastructure Consulting Corporation, Ilium Associates, Optrans and Wooton Jeffreys Consultants, Ltd., *IVHS Strategic Plan for Washington State: VENTURE Washington: Appendices*. Washington State Department of Transportation, Olympia [WA]: November 1993.
3. IBI Group, "Development of the Puget Sound Regional ITS Architecture: Scope of Work", January 2000.
4. ITS Brief for August 31 Congressional Field Hearing, accessed November 14, 2000, http://www.wsdot.wa.gov/eesc/ATB/atb/reports.html
5. Science Applications International Corporation, Metropolitan Model Deployment Initiative (MMDI): Seattle Evaluation Report, FHWA Report No. FHWA-OP-00-020, May 2000.

Contact for further information

Pete Briglia
ITS Program Manager
Washington State Department of Transportation
Telephone: (206) 543-3331
E-mail: briglia@u.washington.edu

Strategies	Techniques																					
	Traffic Data Collection	Traveler Data Collection	Centralized Information	Information Storage & Fusion	Shared Communications Network	Data Analysis	Information Dissemination	Coordinated Traffic Control	Incident Management	Incident Clearance	Smart Corridor Management	Monitoring	Travel Condition Announcement/Warning	Traffic Infrastructure Management	Arterial/Freeway Interchange Management	Automated Congestion Pricing	HOV Prioritization	CVO Fleet/Facility Management	HOV Fleet/Facility Management	Automated Highway	Variable Speed Control	Adaptive Vehicle Control
Reduce Traffic Turbulence (Speed Fluctuation)								✍	✍	✍	✍		✍									✍
Enhance Incident Detection, Verification and Response	✍		✍	✍	✍	✍	✍		✍		✍											
Improve Coverage and Quality of Data Collection	✍	✍	✍	✍		✍																
Coordinate Freeway and Arterial Traffic Management									✍		✍				✍							
Provide Traveler Information	✍	✍	✍	✍	✍	✍	✍					✍	✍									
Support Traveler Safety Measures									✍	✍		✍	✍							✍	✍	✍
Support TDM Programs				✍			✍									✍	✍		✍			
Improve HOV Efficiency and Effectiveness							✍									✍	✍		✍			
Increase Fleet Efficiency/Performance				✍			✍											✍	✍			
Improve Intermodal Connections							✍										✍	✍	✍			
Enhance Pricing Strategies		✍					✍									✍	✍		✍			
Support Actions to Remove Emissions and Energy Use				✍	✍		✍	✍	✍	✍	✍						✍		✍			
Reduce Interagency Barriers			✍	✍	✍		✍		✍		✍							✍	✍			

Exhibit 1 - Strategies and Techniques

Appendix A – Case Studies

	Project Area				
Region	Public Transit/TDM	Traveler Information	Traffic Management	Freight/Fleet Managemen	Additional Services
Central Puget Sound	Completion of Metro and Ferry automatic vehicle location (AVL) systems	Complete FLOW and Traffic Report maps for Seattle; extend to District 3 (Olympia, Tacoma)	Aggressive completion of freeway surveillance system - 90% complete Seattle freeways, 30% complete Tacoma freeways	HAZMAT data - monitor vehicle positions with AVI/AVL	Test AVL on emergency services fleets in Seattle
Spokane	Initiate automatic fare collection using Smart Cards	Test real-time schedule information at CBD transit stops	Incident response teams and state patrol beats	Design AVI stations on I-90	Test Mobile Communications Network (MCN) for enforcement
Vancouver	Test use of smart cards and AVI at major employers to support TDM	Partial freeway changeable message signs	Upgrade arterial signal control system in City of Vancouver	Design on-highway, at-speed weigh stations	Simple in-vehicle sensors, mayday on five percent of new vehicles
Other Urban Areas	Develop software and technical assistance for paratransit matching	Test real-time transit information in Wenatchee	Develop action plan for freeway surveillance system on key segments	Vehicle fleets implement electronic record keeping and safety monitors	Test emergency service vehicle AVL systems
Intercity/Rural	Study automated ferry reservation system on San Juan Islands	Test of variable speed limits and in-vehicle signing on Snoqualmie Pass	I-5 Corridor Communications Plan (Seattle-Portland)	Upgrade Canadian Border Crossing preclearance system	Install portable changeable message signs

Exhibit 2 - Selected Near-Term Projects by Region.

Appendix A – Case Studies

Strategies	Organizations		
	State & Local Legislators	Federal Government	Private Sector
IVHS Technology Demonstrations and Site Visits	2	2	3
Focus Groups	N/A	N/A	2
Issues Forum	1	N/A	3
Brochure - Private Sector Benefits	1	0	2
Informational Brochure Legislators	3	2	N/A
Newsletters	0	0	2
Individual IVHS Technology Example Fact Sheets	2	1	3
Business Round Table	2	1	3
Media Campaign	3	3	2

Exhibit 3 - Marketing Strategies for Targeted Groups.

Appendix A – Case Studies

Appendix B

Project Survey Forms

Alaska Statewide ITS Deployment Strategy

1. Contact: Name/Organization/Address/Phone

Jeff Ottesen
Chief Statewide Planning
Alaska Department of Transportation & Public Facilities
3132 Channel Drive
Juneau, AK 99801
(907) 465-6971

2. Please list the primary agency stakeholders (public, private, academia) that were involved in developing the Strategic Plan.

?? Alaska Department of Transportation and Public Facilities (DOT&PF)
?? Federal Highway Administration (FHWA)
?? Municipality of Anchorage
?? National Weather Service
?? Alaska Department of Administration (communications infrastructure)

Agencies that participated in workshops, meetings, and interviews:
?? Alaska State Troopers
?? University of Alaska
?? Federal Aviation Administration
?? Division of Emergency Services
?? National Park Service
?? Alaska Visitors Association
?? Alaska Railroad
?? Department of Health and Social Services
?? Division of Tourism
?? United States Forest Service (USFS)
?? Alaska Municipal League
?? United States Coast Guard
?? Department of Public Safety
?? Department of Environmental Conservation
?? Capital Transit

3. How long did the Strategic Plan take to develop?

?? Approx. 15 mos.

4. During this period, how many hours/percent of time per month did your agency work on the Strategic Plan?

?? DOT&PF averaged 80 hours per month for all personnel involved with the project

5. Was consultant support used to develop the Strategic Plan?

Yes__X___ No_____

If yes, please provide the consultant contract cost.

?? Approx. $270,000

6. Briefly describe the driving force behind the development of the Strategic Plan.

?? ADOT&PF and other agencies have already identified a number of transportation-related needs
?? They have also developed "individual" ITS applications to address these needs
?? Since individual ITS elements are being developed, it was felt that a "regional" ITS approach would be easier and less costly to plan, design, construct, operate, maintain, and manage and that additional functionality could be realized from a more integrated and complete system
?? A clear ITS deployment strategy is necessary for the allocation of "earmarked" ITS appropriations
?? Need to define a ITS strategy to enable compliance with a Regional ITS Architecture and incorporate national standards (where applicable)

7. What were the primary goals and objectives of the Strategic Plan?

?? The project was not a strategic plan ✍ it was intended to create a statewide architecture and regional ITS deployment strategy that reflects the unique needs of Alaska and is consistent with the National ITS Architecture
?? Complete the corresponding/necessary ITS implementation plans
?? Develop a regional ITS architecture and deployment strategy for the Anchorage area (addressed under an amendment to this contract)

8. Were any elements/features of the Strategic Plan emphasized/highlighted in greater detail? (For example ✍ was there an emphasis on the extension of a Metropolitan Area Strategic Plan, CVO, Public Safety, Operations and Maintenance, Roadway/Weather Management, etc.)

?? Snow and ice control
?? Multi-modal information connections
?? Traveler communications
?? Internal operations
?? Commercial vehicle operations (CVO)

9. How did the Strategic Plan determine its needs, challenges and opportunities?

?? Literature search
?? Workshops and meetings
?? Interviews with stakeholders

10. Did the Strategic Plan include a Statewide/Regional ITS Architecture?

Yes__X___ No_____

If yes, what were the components/deliverables of this Regional ITS Architecture?

?? User Needs Report
?? User Services Report
?? Long-Range Vision
?? Concept of Operations
?? Regional ITS Architecture
?? Implementation Plan (i.e., integration strategy, project identification, deployment strategy, and procurement strategy)

11. Did the Strategic Plan identify potential funding opportunities, sources, or plans/programs?

Yes __X___ No_____

If yes, please list the potential sources.

?? This portion of the project is still under development

12. What is the status of incorporating any Strategic Plan projects into these sources?

?? This portion of the project is still under development

13. Did the Strategic Plan consider operations, maintenance, and management activities?

Yes __X___ No_____

If yes, please briefly explain how these were considered.

?? Two of the five key program areas are snow and ice control and internal operations ✍ these program areas specifically deal with operations, maintenance, and management

14. Did the Strategic Plan identify costs and benefits associated with its selected ITS Projects?

Yes __X___ No_____

If yes, please briefly describe how.

?? Costs will be order of magnitude estimates
?? Benefits are primarily qualitative in nature

15. What benefits and/or lessons learned were realized by developing the Strategic Plan?

?? ITS concept-of-operations
?? ITS project identification
?? ITS deployment schedule
?? ITS procurement strategy
?? Long-term outreach strategy

16. What is the current status of the Strategic Plan?

?? Anticipate completion May, 2001

Arkansas Statewide ITS Strategic Plan

1. **Contact: Name/Organization/Address/Phone**

   Alan Meadors
   Planning Department
   Arkansas Highway & Transportation Division
   (501) 569-2380

2. **Please list the primary agency stakeholders (public, private, academia) that were involved in developing the Strategic Plan.**

   ?? Arkansas Highway & Transportation Division (AHTD)
   ?? Trucking companies
   ?? Arkansas State Police
   ?? Local police, fire, and emergency service organizations

3. **How long did the Strategic Plan take to develop?**

   ?? Anticipated start date is March, 2001
   ?? Project duration is approx. 12 mos.

4. **During this period, how many hours/percent of time per month did your agency work on the Strategic Plan?**

   N/A

5. **Was consultant support used to develop the Strategic Plan?**

   Yes__X___ No_____

   If yes, please provide the consultant contract cost.

   ?? Approx. $185,000

6. **Briefly describe the driving force behind the development of the Strategic Plan.**

   ?? AHTD is planning a $500 million Interstate rehabilitation program and is concerned about congestion and delays due to construction

   ?? AHTD wants to ensure that during this period, that work zone traffic management and ITS applications are used where appropriate

7. **What were the primary goals and objectives of the Strategic Plan?**

   TBD

8. **Were any elements/features of the Strategic Plan emphasized/highlighted in greater detail? (For example ✍ was there an emphasis on the extension of a Metropolitan Area Strategic Plan, CVO, Public Safety, Operations and Maintenance, Roadway/Weather Management, etc.)**

   ?? Commercial Vehicle Operations (CVO)
   ?? Work zone management
   ?? Road Weather Information Systems (RWIS)
   ?? Advanced Traveler Information Systems (ATIS)
   ?? Advanced Transportation Management Systems (ATMS) in more Urban areas
   ?? Operations and Maintenance (O&M) activities
   ?? Coordination with public safety agencies

9. How did the Strategic Plan determine its needs, challenges and opportunities?

TBD

10. Did the Strategic Plan include a Statewide/Regional ITS Architecture?

Yes___X__ No_____

If yes, what were the components/deliverables of this Regional ITS Architecture?

?? Plan to develop a concept of operations, regional integration strategy and physical architecture
?? No desire to create a logical architecture

11. Did the Strategic Plan identify potential funding opportunities, sources, or plans/programs?

Yes __X__ No_____

If yes, please list the potential sources.

?? Plan to perform these activities within the project

12. What is the status of incorporating any Strategic Plan projects into these sources?

N/A

13. Did the Strategic Plan consider operations, maintenance, and management activities?

Yes __X__ No_____

If yes, please briefly explain how these were considered

?? Plan to perform these activities within the project

14. Did the Strategic Plan identify costs and benefits associated with its selected ITS Projects?

Yes __X__ No_____

If yes, please briefly describe how.

?? **Plan to perform these activities within the project**

15. What benefits and/or lessons learned were realized by developing the Strategic Plan?

?? None yet

16. What is the current status of the Strategic Plan?

?? Project to start March, 2001
?? Still waiting for a signed contract from a subcontractor

State of Idaho ITS Strategic Plan

1. Contact: Name/Organization/Address/Phone:

Lance Johnson
Idaho Transportation Department
P.O. Box 7129
Boise, ID 83707-1129
(208) 334-8557

2. Please list the primary agency stakeholders (public, private, academia) that were involved in developing the Strategic Plan.

?? Idaho Transportation Department (ITD) District staff
?? ITD Headquarter representatives
?? County highway districts
?? Metropolitan planning organizations (MPOs)
?? Cities/municipalities
?? Federal Highway Administration
?? Transit authorities
?? Local Highway Technical Assistance Council
?? Idaho State Police
?? University of Idaho

3. How long did the Strategic Plan take to develop?

?? The plan was developed in two (2) phases, which were completed over a 2-year period
?? Phase I ✍ Served to bring agencies together, promote ITS awareness, evaluate the potential applicability of ITS, and produce a preliminary plan
?? Phase II ✍ Identified needs, strategies and market packages; developed regional and statewide architectures, and identified ITS projects and programs

4. During this period, how many hours per month did your agency work on the Strategic Plan.

?? Approx. $90,000 spent by State workforce

5. Was consultant support used to develop the Strategic Plan?

Yes__X___ No_____

If yes, please provide the consultant contract cost.

?? Approx. $330,000

6. Briefly describe the driving force behind the development of the Strategic Plan.

?? There was a desire at the state level to participate in the safety and efficiently benefits associated with ITS initiatives

7. What were the primary goals and objectives of the Strategic Plan?

?? Phase I goals and objectives:
  - ?? Form the Idaho ITS Committee
  - ?? Promote ITS awareness and education
  - ?? Acknowledge ITS applicability to Idaho
  - ?? Identify the most promising ITS technology areas and applications

?? Phase II goals and objectives
  - ?? Identify specific ITS projects
  - ?? Develop a phased implementation approach
  - ?? Establish funding mechanisms
  - ?? Phase II of the state's ITS planning process

8. Were any elements/features of the Strategic Plan emphasized/highlighted in greater detail? (For example ✍ was there an emphasis on the extension of a Metropolitan Area Strategic Plan, CVO, Public Safety, Operations and Maintenance, Roadway/Weather Management, etc.)

?? No

9. How did the Strategic Plan determine its needs, challenges and opportunities?

?? A document and plan review was conducted of several Idaho cities and ITD Districts in order to identify problem areas
?? The ITS Committee identified potential ITS applications that could address these problem areas
?? Based on these transportation needs and potential applications, basic functional requirements for future ITS systems were developed

10. Did the Strategic Plan include a Statewide/Regional ITS Architecture?

Yes__X___ No_____

If yes, what were the components/deliverables of this Regional ITS Architecture?

?? Mapped local/regional stakeholders' existing systems to the National ITS Architecture's subsystems and terminators
?? Identified applicable Market Packages
?? Regional & Statewide Architecture (Existing & Planned)
  - ?? Idaho was divided into six (6) regions for architecture purposes
  - ?? Tailored "sausage diagram" (Physical Architecture)
  - ?? Tailored subsystem interconnect diagrams (Organizational Architecture)
  - ?? Tailored architecture flows between subsystems

11. Did the Strategic Plan identify potential funding opportunities, sources, or plans/programs?

Yes __X___ No_____

If yes, please list the potential sources.

?? Federal-aid Funds Administered by ITD
  - ?? Interstate Maintenance
  - ?? National Highway System
  - ?? State Transportation Improvement Program (STIP)
  - ?? TEA-21 (ITS)
  - ?? Congestion Mitigation and Air Quality (CMAQ)
  - ?? Federal Transit Administration (FTA)

?? State Funds Administered by ITD
  - ?? State-funded Program

12. What is the status of incorporating any Strategic Plan projects into these sources?

?? This is the next step in the process, it has not been completed

13. Did the Strategic Plan consider operations, maintenance, and management activities?

Yes __X___ No_____

If yes, please briefly explain how these were considered.

?? Project descriptions included order of magnitude estimates of annual operations and maintenance costs

14. Did the Strategic Plan identify costs and benefits associated with its selected ITS Projects?

Yes __X___ No_____

If yes, please briefly describe how.

?? Planning-level estimates of ITS project costs were identified for design, implementation, and on-going operations and maintenance

?? The plan does not provide estimates of benefits for ITS applications

15. What benefits and/or lessons learned were realized by developing the Strategic Plan?

?? This statewide plan required participation from many state and local agencies

?? Finding, developing, and maintaining champions in each agency was the key to success

16. What is the current status of the Strategic Plan?

?? Plan was completed December, 2000

?? Currently programming identified ITS projects into the STIP through State coordination with the Districts

?? Deployed projects include variable message signs (VMS), closed-circuit television cameras (CCTV), and a transportation management center (TMC) in Boise jointly operated with Ada County

?? The University of Idaho is currently exploring signal upgrades to improve interconnectivity of signals in the City of Moscow (still in early planning stages)

Illinois Statewide ITS Strategic Plan

1. **Contact: Name/Organization/Address/Phone**

   Dave Zavattero
   Illinois Department of Transportation
   ITS Program Office
   (847) 705-4800
   zavatteroda@nt.dot.state.il.us

   Wendall Meyer
   ITS Specialist
   Federal Highway Administration
   (217) 492-4634

2. **Please list the primary agency stakeholders (public, private, academia) that were involved in developing the Strategic Plan.**

   ?? Illinois Department of Transportation (IDOT)
   ?? University of Illinois
   ?? Federal Highway Administration (FHWA)

3. **How long did the Strategic Plan take to develop?**

   ?? Completion of the Strategic Plan is anticipated in 18 mos.

4. **During this period, how many hours/percent of time per month did your agency work on the Strategic Plan?**

   N/A

5. **Was consultant support used to develop the Strategic Plan?**

   Yes__X___No_____

   If yes, please provide the consultant contract cost.

   ?? Phase I is being completed by the University of Illinois
   ?? Illinois DOT currently planning to develop an RFP to obtain consultant support
      ?? Completely document the ITS Strategic Plan
      ?? Possibility of including a Statewide ITS Architecture

6. **Briefly describe the driving force behind the development of the Strategic Plan.**

   ?? The development of the Illinois DOT Statewide Strategic plan has prompted the Illinois ITS Program Office to begin development of an ITS Technology Application Strategic Business Plan

7. **What were the primary goals and objectives of the Strategic Plan?**

   ?? Expand on the Illinois DOT Statewide Strategic goals and how they relate to ITS Technology Applications.
   ?? Customer Service and Partnerships (e.g., quality of services, improving safety, developing alliances both public and private, etc.)
   ?? Learning/Growth (e.g., internal development, staff, etc.)
   ?? Best Business Practices (e.g., allocating resources, investments, environment, efficiency, etc.)
   ?? Delivery of Programs and Projects (e.g., development, deployment, delivery, etc.)

8. Were any elements/features of the Strategic Plan emphasized/highlighted in greater detail? (For example ✍ was there an emphasis on the extension of a Metropolitan Area Strategic Plan, CVO, Public Safety, Operations and Maintenance, Roadway/Weather Management, etc.)

TBD

9. How did the Strategic Plan determine its needs, challenges and opportunities?

?? Currently developing a questionnaire (Phase I) to help establish the existing ITS system inventory and future needs (scheduled for completion March, 2001)

10. Did the Strategic Plan include a Statewide/Regional ITS Architecture?

Yes_____ No_____

If yes, what were the components/deliverables of this Regional ITS Architecture?

?? Potential consultant contract has possibility of including a Statewide ITS Architecture

11. Did the Strategic Plan identify potential funding opportunities, sources, or plans/programs?

Yes _____ No_____

If yes, please list the potential sources.

TBD

12. What is the status of incorporating any Strategic Plan projects into these sources?

TBD

13. Did the Strategic Plan consider operations, maintenance, and management activities?

Yes _____ No_____

If yes, please briefly explain how these were considered.

TBD

14. Did the Strategic Plan identify costs and benefits associated with its selected ITS Projects?

Yes _____ No_____

If yes, please briefly describe how.

TBD

15. What benefits and/or lessons learned were realized by developing the Strategic Plan?

TBD

16. What is the current status of the Strategic Plan?

?? The project just recently held its initial kick-off meeting
?? Currently developing a questionnaire (Phase I) to help establish the existing ITS system inventory and future needs (scheduled for completion March, 2001)

Iowa DOT Integrated ITS and Services Deployment Plan

1. **Contact: Name/Organization/Address/Phone**

   Craig Markley
   Iowa Department of Transportation
   800 Lincoln Way
   Ames, IA 50010
   (515) 239-1027

2. **Please list the primary agency stakeholders (public, private, academia) that were involved in developing the Strategic Plan.**

   ?? Iowa Department of Transportation
   ?? Local city officials around the state
   ?? Local chambers of commerce around the state
   ?? Iowa City Fire Department
   ?? Federal Highway Administration (FHWA)
   ?? Five Oaks Charters (private transit operator)
   ?? INRCOG (Waterloo-Cedar Falls area council of government)
   ?? Iowa Department of Public Health
   ?? Johnson County Council of Governments
   ?? Linn County
   ?? MIDAS Council of Governments
   ?? Omaha Metropolitan Planning Organization
   ?? Ottumwa Transit
   ?? Polk County
   ?? Region XII Council of Governments (Sioux City area)
   ?? RIDES Regional Transit Authority
   ?? Sioux City Transit
   ?? Southeast Iowa Regional Transit Authority
   ?? Southwest Iowa Regional Transit Authority
   ?? Tama County EMA/911
   ?? University of Iowa
   ?? Waterloo Fire and Rescue
   ?? Waterloo Police Department
   ?? West Des Moines Police Department

3. **How long did the Strategic Plan take to develop?**

   ?? Approx. 14 mos.

4. **During this period, how many hours per month did your agency work on the Strategic Plan?**

   TBD

5. **Was consultant support used to develop the Strategic Plan?**

   Yes__X___ No_____

   If yes, please provide the consultant contract cost.

   ?? Approx. $300,000

6. Briefly describe the driving force behind the development of the Strategic Plan.

- ?? Iowa already had a number of ITS projects deployed and operational around the state
- ?? In addition, neighboring states such as Minnesota, Illinois, and Missouri had aggressive ITS deployment schedules
- ?? Therefore, Iowa wished to develop a plan for organized deployment of ITS that would address the needs of travelers and key stakeholders and help to integrate current Iowa ITS projects, neighboring states' projects, and future projects together

7. What were the primary goals and objectives of the Strategic Plan?

- ?? Safety
  - ?? Increase traveler knowledge of road/weather conditions and vehicle crashes
  - ?? Improve emergency medical response time
  - ?? Improve response to HAZMAT emergencies
  - ?? Reduce motor carrier safety violations
  - ?? Minimize at-grade railroad crossing accidents
  - ?? Reduce the number of safety-related moving violations
  - ?? Improve safety/security for pedestrians, cyclists and transit users
- ?? Preservation
  - ?? Improve availability, quality and convenience of rural and urban public transportation
  - ?? Improve the management and maintenance of existing infrastructure
  - ?? Reduce motor vehicle emissions and improve air quality
  - ?? Reduce overall growth rate of vehicle miles traveled
- ?? Efficiency
  - ?? Reduce incident response and clearance time
  - ?? Reduce traffic delays through improved traffic management and peak period flow
  - ?? Reduce commuting congestion by supporting telecommuting
  - ?? Provide opportunities for intermodal connections
  - ?? Increase throughput for all modes
  - ?? Improve traveler knowledge of congestion and delays through improved trip coordination, pre-trip route selection, and traveler information
- ?? Economic Development
  - ?? Reduce shipping and delivery delays and subsequent cost of fleet operations
  - ?? Increase traveler knowledge of tourism
  - ?? Improve access to and from rural communities for travel, goods, services and information
  - ?? Increase direct emp loyment through new ITS industry
- ?? Balance
  - ?? Provide balance between urban and rural communities
  - ?? Provide balance between preservation and expansion
  - ?? Provide balance between economic development and quality of life
  - ?? Provide balance among transportation modes
  - ?? Provide balance between benefits and costs

8. Were any elements/features of the Strategic Plan emphasized/highlighted in greater detail? (For example ✍ was there an emphasis on the extension of a Metropolitan Area Strategic Plan, CVO, Public Safety, Operations and Maintenance, Roadway/Weather Management, etc.)

- ?? Rural activities
- ?? Weather-related events
- ?? Coordinating ITS activities in several small cities around Iowa

9. How did the Strategic Plan determine its needs, challenges and opportunities?

?? Conducted statewide ITS stakeholder survey
?? Held regional stakeholder meetings
?? Held divisional meetings with Iowa DOT staff, including maintenance
?? Held workshop with steering committee to prioritize transportation problems and to discuss applicability of potential solutions

10. Did the Strategic Plan include a Statewide/Regional ITS Architecture?

Yes__X___ No_____

If yes, what were the components/deliverables of this Regional ITS Architecture?

?? User Service Plan
?? Customized Market Packages
?? Subsystems and Equipment Packages
?? System Architecture
?? Identification of key standards

11. Did the Strategic Plan identify potential funding opportunities, sources, or plans/programs?

Yes __X___ No_____

If yes, please list the potential sources.

?? Funding opportunities will primarily involve State DOT funding

12. What is the status of incorporating any Strategic Plan projects into these sources?

?? Plan for ITS activities to be funded as part of State DOT construction, maintenance, or operations projects
?? Therefore, ITS may not have a separate funding allocation, but would be included as an aspect of these larger projects

13. Did the Strategic Plan consider operations, maintenance, and management activities?

Yes __X___ No_____

If yes, please briefly explain how these were considered.

?? Operations and maintenance costs were estimated for each of proposed projects
?? Iowa DOT personnel were consulted throughout the planning process so as to assess their roles and activities within the Strategic Plan

14. Did the Strategic Plan identify costs and benefits associated with its selected ITS Projects?

Yes __X___ No_____

If yes, please briefly describe how.

?? Benefits were assessed based upon area needs that would be addressed by the projects, as well as by looking at successes in other areas
?? Costs were assessed by analyzing the cost of similar projects deployed nationwide
?? Costs included operations and maintenance, equipment, and implementation

15. What benefits and/or lessons learned were realized by developing the Strategic Plan?

- ?? Stakeholders involved had a wide range of interest in the planning activities and the plan itself
  - ?? Some agencies involved remarked that they were primarily interested in the ITS plan defining what ITS technologies should be deployed
  - ?? They were not as interested in most of the other activities (e.g., architecture development, learning the planning process, etc.)
- ?? Stakeholders will include those with varying levels of interest in ITS and varying levels of time that may be dedicated to learning and understanding all aspects of ITS

16. What is the current status of the Strategic Plan?

- ?? The Strategic Plan was completed April, 2000
- ?? However, it is still awaiting final acceptance and approval from Iowa DOT

CHART 2000 -- Maryland Statewide ITS Business Plan

1. Contact: Name/Organization/Address/Phone

Michael J. Zezeski, Director
Office of CHART and ITS Development
Maryland State Highway Administration
4791 Connelly Drive
Hanover, MD 21076
(410) 787-5859

2. Please list the primary agency stakeholders (public, private, academia) that were involved in developing the Strategic Plan.

?? Maryland State Highway Administration (MSHA)
?? Maryland State Police
?? Maryland Transportation Authority
?? Maryland Department of Transportation
?? University of Maryland
?? Maryland Counties

3. How long did the Strategic Plan take to develop?

?? Approx. 6 mos.

4. During this period, how many hours/percent of time per month did your agency work on the Strategic Plan?

?? Approx. 10% of time per month

5. Was consultant support used to develop the Strategic Plan?

Yes__X___ No_____

If yes, please provide the consultant contract cost.

?? Approx. $70,000

6. Briefly describe the driving force behind the development of the Strategic Plan.

?? The initial ITS Business Plan was completed in October, 1996 and updated June, 1998
?? Both documents needed to be updated
?? Further need to strategize and articulate the ITS program's goals and objectives in support of MSHA's overall business plan for the next six (6) years (2001-2006)

7. What were the primary goals and objectives of the Strategic Plan?

?? Traffic and Roadway Monitoring
?? Incident Management
?? Traveler Information
?? Traffic Management
?? System Integration and Communication

8. Were any elements/features of the Strategic Plan emphasized/highlighted in greater detail? (For example ✍ was there an emphasis on the extension of a Metropolitan Area Strategic Plan, CVO, Public Safety, Operations and Maintenance, Roadway/Weather Management, etc.)

?? Systems Integration and Communication were more heavily emphasized in the plan
?? Regional interoperability and field device deployment strategy was also heavily emphasized

9. How did the Strategic Plan determine its needs, challenges and opportunities?

?? The plan was developed concurrently with a statewide functional visioning effort
?? ITS development team sought input from the seven (7) state engineering district offices

10. Did the Strategic Plan include a Statewide/Regional ITS Architecture?

Yes__X___ No_____

If yes, what were the components/deliverables of this Regional ITS Architecture?

?? CHART II System
    ?? Based upon requirements-driven technology that allows for an open system architecture and modular applications
    ?? Capable of evolving as functional, performance, and technological needs change
?? CHART II System used the framework of the National ITS Architecture, but complete detailed architecture development in Maryland is still on-going
    ?? Vision Statements of Future CHART II System
    ?? User Services
    ?? Business Area Architecture Report
    ?? CHART Conceptual Architecture
    ?? Performance Objectives of the Future CHART II System
    ?? Business Process Model View
    ?? Organization Model View
    ?? Location Model View
    ?? Application Model View
    ?? Data Model View
    ?? Technology Model View

11. Did the Strategic Plan identify potential funding opportunities, sources, or plans/programs?

Yes __X___ No_____

If yes, please list the potential sources.

?? Congestion Mitigation and Air Quality (CMAQ)
?? Interstate Discretionary Funds
?? Federal ITS Earmark

12. What is the status of incorporating any Strategic Plan projects into these sources?

?? A cash flow has been submitted with the plan and these funding sources are identified for all projects

13. Did the Strategic Plan consider operations, maintenance, and management activities?

Yes __X___ No_____

If yes, please briefly explain how these were considered.

?? Funds were identified and annual budgets were created using historical data

14. Did the Strategic Plan identify costs and benefits associated with its selected ITS Projects?

Yes __X___ No_____

If yes, please briefly describe how.

?? The plan is based on "managing for results"
?? All ITS goals have specific measurable objectives that can be evaluated and assessed for their corresponding benefit

15. What benefits and/or lessons learned were realized by developing the Strategic Plan?

?? Identifying specific projects and planning their completion by targeted deadline is essential to management of an effective ITS Program

16. What is the current status of the Strategic Plan?

?? It was completed October, 2000

Michigan ITS Strategic Plan

1. Contact: Name/Organization/Address/Phone

Kunwar Rajendra, PhD, P.E.
Engineer of Intelligent Transportation Systems
Michigan Department of Transportation
State Transportation Building
425 W. Ottawa St.
P.O. Box 30050
Lansing, MI 48909
(517) 335-2893

2. Please list the primary agency stakeholders (public, private, academia) that were involved in developing the Strategic Plan.

?? Michigan Department of Transportation
?? Federal Highway Administration (FHWA)
?? University of Michigan
?? Road Commission for Oakland County
?? Michigan State Police
?? Ann Arbor Transit Authority
?? City of Detroit
?? U.S. Army Tank-Automotive Command
?? Chrysler Corporation
?? Ford Motor Company
?? Rockwell International Corporation
?? Eaton Corporation
?? Siemens Automotive

3. How long did the Strategic Plan take to develop?

?? Approx. 12 mos.

4. During this period, how many hours per month did your agency work on the Strategic Plan?

?? As the project was completed in 1996, staff time estimates were not available

5. Was consultant support used to develop the Strategic Plan?

Yes__X___ No_____

If yes, please provide the consultant contract cost.

?? Approx. $90,000

6. Briefly describe the driving force behind the development of the Strategic Plan.

?? The State of Michigan is the home of the American automotive industry and was a test bed for dozens of ITS initiatives during the late 1980's and early 1990's
?? In 1996, the initial Michigan ITS Strategic Plan was developed with the following focus areas:
    ?? Early deployment of ITS for international border crossings between the U.S. and Canada
    ?? Reliance on ITS-supported tourism to spread ITS services throughout the State
    ?? Expand the deployment of the Intelligent Transportation Infrastructure to host ITS innovations in model deployment initiatives
?? Need to update the 1996 ITS Strategic Plan
?? Desire to develop an ITS plan which identifies several key project areas that could be deployed in the Greater Detroit Metropolitan Area

7. What were the primary goals and objectives of the Strategic Plan?

- ?? Purpose
  - ?? Develop a statewide vision for ITS deployment
  - ?? Lay out a strategy for deploying ITS throughout the State over the next 15-years
- ?? Objectives
  - ?? Serve as a living document that would be updated periodically
  - ?? Assist in developing continued consensus among stakeholder groups
  - ?? Provide a basis for establishing ITS alliances and partnerships

8. Were any elements/features of the Strategic Plan emphasized/highlighted in greater detail? (For example ✍ was there an emphasis on the extension of a Metropolitan Area Strategic Plan, CVO, Public Safety, Operations and Maintenance, Roadway/Weather Management, etc.)

- ?? The ITS Strategic Plan contained 19 strawman action plans which were to be discussed further with relevant stakeholder groups of the Advisory Council
- ?? These action plans were divided among six (6) categories that included thrusts (focus areas), development, improvement, planning, education/outreach, and organization
- ?? Five (5) areas or projects were highlighted to include:
  - ?? International border crossings
  - ?? System development to provide traffic information to private organizations under a MOTORCITI program
  - ?? Use of ITS to support and enhance tourism
  - ?? Development of plans for becoming an Early Model Deployment area
  - ?? Integration of Advanced Traffic Management Systems with Advanced Traveler Information Systems

9. How did the Strategic Plan determine its needs, challenges and opportunities?

- ?? Conducted interviews with selected ITS Michigan board members
  - ?? Guiding principles for the Strategic Plan
  - ?? Michigan's unique strengths and limitations in ITS
  - ?? Major thrusts in the Strategic Plan
  - ?? Other topics that should be addressed by the Strategic Plan

10. Did the Strategic Plan include a Statewide/Regional ITS Architecture?

Yes_____ No__X___

If yes, what were the components/deliverables of this Regional ITS Architecture?

- ?? A Regional ITS Architecture is currently in development for the Greater Detroit Metropolitan Area with plans for expansion into a statewide architecture

11. Did the Strategic Plan identify potential fundi ng opportunities, sources, or plans/programs?

Yes __X___ No_____

If yes, please list the potential sources.

- ?? The Michigan ITS Strategic Plan identified several potential funding sources and opportunities
- ?? The majority of funding for ITS in Michigan was initially through Congressional earmarking; however, it was determined that other sources would be needed
- ?? Potential funding sources identified included:
  - ?? U.S. DOT/FHWA
  - ?? State transportation funds
  - ?? U.S. Army Tank-Automotive Command
  - ?? Private sector funding from the major automotive organizations

12. What is the status of incorporating any Strategic Plan projects into these sources?

- ?? DIRECT (Driver Information Radio using Experimental Communication Technologies)
  - ?? Funded via FHWA, MDOT, and several private partners
- ?? US-Canada International Border Crossings
  - ?? Funded via MDOT, FHWA, State of New York, and the Ministry of Transportation of Ontario
- ?? ATMS/ATIS deployment in metropolitan Detroit and Grand Rapids
  - ?? Funded via FHWA and MDOT

13. Did the Strategic Plan consider operations, maintenance, and management activities?

Yes _____ No__X___

If yes, please briefly explain how these were considered.

14. Did the Strategic Plan identify costs and benefits associated with its selected ITS Projects?

Yes __X___ No_____

If yes, please briefly describe how.

- ?? A cost/benefit worksheet was developed for the 1998 Michigan ITS/CVO Business Plan
- ?? The worksheet maps low versus high costs and benefits across a grid for the recommended projects

15. What benefits and/or lessons learned were realized by developing the Strategic Plan?

- ?? 1996 ITS Strategic Plan focused on stakeholders in Southeast Michigan since they were more versed/accepting of ITS so that the region could benefit and provide an example for the State
- ?? Since the project was developed under such a short time frame, stakeholder involvement could have been improved

16. What is the current status of the Strategic Plan?

- ?? The initial ITS Strategic Plan was completed in 1996
- ?? Significant efforts have been made since completion of the plan to deploy and implement the projects specified in the major project areas
- ?? Currently, plans exist to develop a new ITS Strategic Plan which will expand the focus from the Greater Detroit Metropolitan Area to a full statewide ITS Strategic Plan
- ?? At this time, a schedule has not been set for the new plan's rollout

Missouri Statewide Integrated ITS Business and Deployment Plan

1. Contact: Name/Organization/Address/Phone

Rick Bennett
Missouri Department of Transportation
2211 St. Marys Blvd., P. O. Box 270
Jefferson City, MO 65102
Phone: (573) 526-4842
FAX: (573) 526-0120

2. Please list the primary agency stakeholders (public, private, academia) that were involved in developing the Strategic Plan.

?? Missouri Department of Transportation
?? Missouri Highway Patrol
?? Regional Transit Agencies
?? County Commissioners
?? Local City Officials (statewide)
?? Local Chambers of Commerce (statewide)
?? Local Police & Fire Departments
?? Federal Highway Administration
?? Kansas Department of Transportation

3. How long did the Strategic Plan take to develop?

?? Anticipate approx. 12 mos.
?? The planning process is still in the early stages ✍ initial outreach planned for March, 2001

4. During this period, how many hours per month did your agency work on the Strategic Plan?

?? The ITS Strategic Plan is currently under development and total costs are unknown at this time

5. Was consultant support used to develop the Strategic Plan?

Yes__X__ No_____

If yes, please provide the consultant contract cost.

?? Approx. $575,000

6. Briefly describe the driving force behind the development of the Strategic Plan.

?? Missouri DOT desires to develop a statewide ITS program that integrates the various systems, provides consistency, and eliminates redundant system development
?? They also are working to mainstream ITS into the transportation business process
?? ITS will be a tool to address transportation issues and will be coupled with other transportation improvement tools
?? Missouri DOT are involving stakeholders in ITS planning and development to assure that these tools are available to help meet regional, state, and local transportation needs

7. What were the primary goals and objectives of the Strategic Plan?

?? Coordinate existing ITS Programs
?? Mainstream ITS into Missouri DOT's business process (e.g., Design, Planning, etc.)
?? Create a strategic ITS Vision
?? Identify short-, medium-, and long-term ITS Projects (with cost estimates)
?? Develop a statewide ITS architecture

8. Were any elements/features of the Strategic Plan emphasized/highlighted in greater detail? (For example ✍ was there an emphasis on the extension of a Metropolitan Area Strategic Plan, CVO, Public Safety, Operations and Maintenance, Roadway/Weather Management, etc.)

?? Freeway management (Urban areas)
?? Incident management (Urban areas)
?? Road Weather Information Systems (RWIS)
?? Commercial Vehicle Operations (CVO) coordination
?? Traffic signal systems

9. How did the Strategic Plan determine its needs, challenges and opportunities?

TBD

10. Did the Strategic Plan include a Statewide/Regional ITS Architecture?

Yes__X__ No_____

If yes, what were the components/deliverables of this Regional ITS Architecture?

?? A statewide ITS architecture will be developed
?? Urban regional architectures are currently being developed under separate efforts
?? In the near future, it is anticipated that rural "regional" architectures will be developed
?? Then, all regional architectures would be integrated with the statewide architecture

11. Did the Strategic Plan identify potential funding opportunities, sources, or plans/programs?

Yes __X___ No_____

If yes, please list the potential sources.

?? Conventional highway funds (i.e., National Highway Trust Fund)
?? Congestion Mitigation and Air Quality (CMAQ)
?? Safety funds
?? State DOT operating funds
?? State/Local/Private partnering
?? ITS Earmarks

12. What is the status of incorporating any Strategic Plan projects into these sources?

TBD

13. Did the Strategic Plan consider operations, maintenance, and management activities?

Yes __X___ No_____

If yes, please briefly explain how these were considered.

?? Operations and maintenance will be considered in the later stages of the Strategic Plan

14. Did the Strategic Plan identify costs and benefits associated with its selected ITS Projects?

Yes __X___ No_____

If yes, please briefly describe how.

?? Strategic Plan will include development, deployment, and operations and maintenance costs

15. What benefits and/or lessons learned were realized by developing the Strategic Plan?

?? Involvement of internal and external (to MoDOT) stakeholders is proving very valuable
?? The workshops are a great forum to get feedback from stakeholders on both ITS and non-ITS issues

16. What is the current status of the Strategic Plan?

?? The plan has just started with initial outreach efforts conducted March, 2001
?? The plan anticipates completion November, 2001

ITS Strategic Plan for the I-80/US 395 Corridors (Nevada)

1. Contact: Name/Organization/Address/Phone

Mike Quintero
Nevada Department of Transportation
1263 S. Stewart St.
Carson City, Nevada 89712
(775) 888-7221

2. Please list the primary agency stakeholders (public, private, academia) that were involved in developing the Strategic Plan.

?? Nevada Department of Transportation
?? City of Wendover
?? Elko Chamber of Commerce
?? Nevada Regional Transit Commission
?? City of Reno
?? Nevada Highway Patrol

3. How long did the Strategic Plan take to develop?

?? Approx. 12 mos.
?? Start ✍ July, 2000
?? End ✍ June 2001

4. During this period, how many hours per month did your agency work on the Strategic Plan?

?? Approx. 20-30 hrs.

5. Was consultant support used to develop the Strategic Plan?

Yes__X___ No_____

If yes, please provide the consultant contract cost.

?? Approx. $250,000

6. Briefly describe the driving force behind the development of the Strategic Plan.

?? The unique mountainous terrain and very remote rural areas along I-80 make this corridor a challenging corridor to travel
?? The upcoming Olympics in Salt Lake City was an impetus for performing the planning study at this time

7. What were the primary goals and objectives of the Strategic Plan?

- ?? Improve the safety of highway travel through the application of ITS
- ?? Increase the efficiency and access to traveler information for travelers along the corridor
- ?? Advance the state of traveler mobility along the corridor, both locally and regionally
- ?? Assist local communities along the corridor with the promotion of attractions and special events, and by increasing tourism through the application of ITS
- ?? Ensure compatibility and consistency with the direction of national ITS initiatives
- ?? Encourage public interagency cooperation and participation of private industry in the process of deploying and operating ITS along the corridor
- ?? Successfully secure funding for the deployment, operations, and maintenance of identified ITS components
- ?? Educate the general public, public agencies, and government officials of the potential for ITS along the corridor

8. Were any elements/features of the Strategic Plan emphasized/highlighted in greater detail? (For example ✍ was there an emphasis on the extension of a Metropolitan Area Strategic Plan, CVO, Public Safety, Operations and Maintenance, Roadway/Weather Management, etc.)

- ?? Rural traveler information
- ?? Information specifically for maintenance operators
- ?? Integrate corridor ITS initiatives with the Reno Metro Area's ITS activities

9. How did the Strategic Plan determine its needs, challenges and opportunities?

- ?? Held workshops in the four (4) key areas along the Corridor
- ?? Performed limited one-on-one follow-up discussions
- ?? Reviewed accident statistics, weather statistics, and other planning studies in the Corridor
- ?? Conducted a mail/FAX survey of key stakeholders along the Corridor

10. Did the Strategic Plan include a Statewide/Regional ITS Architecture?

Yes__X___ No_____

If yes, what were the components/deliverables of this Regional ITS Architecture?

- ?? User Service Plan
- ?? Market Package Plan
- ?? Logical Architecture
  - ?? Functional definitions and requirements
  - ?? Logical diagram
- ?? Physical Architecture
  - ?? Tailored "sausage diagrams" for each Market Package
- ?? Turbo Architecture Database
  - ?? Inventory
  - ?? Market Packages
  - ?? Flow diagrams
  - ?? Subsystem interconnect diagrams

11. Did the Strategic Plan identify potential funding opportunities, sources, or plans/programs?

Yes __X____No_____

If yes, please list the potential sources.

- ?? The task of identifying funding opportunities and sources has not yet been performed

12. What is the status of incorporating any Strategic Plan projects into these sources?

- ?? Since the plan has not been completed, this decision will be based upon the plan's final results

13. Did the Strategic Plan consider operations, maintenance, and management activities?

Yes ___X__ No_____

If yes, please briefly explain how these were considered.

?? Following acceptance of the near-term deployment projects, an entire task will be dedicated to developing an operations and maintenance plan

14. Did the Strategic Plan identify costs and benefits associated with its selected ITS Projects?

Yes __X___ No_____

If yes, please briefly describe how.

?? Costs and benefits will be reviewed and addressed in the operations plan (above)
?? During the selection of near-term projects, benefits of each technology were presented in terms of the extent to which each technology:
    ?? Addressed the needs along the corridor
    ?? Met the goals and objectives of the study
    ?? Ready for deployment

15. What benefits and/or lessons learned were realized by developing the Strategic Plan?

?? Each rural community is very interested in expressing the needs and interests that may be addressed by ITS
?? However, if outreach is conducted to these communities, there has to be steady feedback given to them during the planning process and follow-up explaining what will be done in the community, or why their specific needs will not be addressed at this time
?? Initial outreach and needs assessment must be responded to within the plan

16. What is the current status of the Strategic Plan?

?? The ITS Strategic Plan is still being developed (currently in month 8 of a 12 month process)
?? The IT'S Architecture is completed and currently being reviewed by the Project Steering Committee
?? Key technologies have been identified (currently under review)
?? Short-term deployments are presently being selected

Sierra Nevada ITS Strategic Plan (California)

1. **Contact: Name/Organization/Address/Phone**

David Clark
New Technology and Research Program
California Department of Transportation (Caltrans)
P.O. Box 942873
Sacramento, CA 94273-0001
(916) 657-4060
dave.clark@dot.ca.gov

2. **Please list the primary agency stakeholders (public, private, academia) that were involved in developing the Strategic Plan.**

?? **Caltrans District 9 (Bishop)**
?? **Caltrans District 10 (Stockton)**
?? **Caltrans New Technology and Research Program (NTRP)**
?? **California Highway Patrol (CHP)**
?? **County Transportation, Planning, and Community Development Agencies (9 Counties)**
?? **Local Business Owners and Major Employers**
?? **National Park Service**
?? **United States Forest Service (USFS)**
?? **Bureau of Land Management (BLM)**
?? **National Weather Service (NWS)**
?? **Central Sierra Planning Council**
?? **Nevada Department of Transportation**

3. **How long did the Strategic Plan take to develop?**

?? Approx. 27 mos.
?? Start ✍ April, 2000
?? End ✍ June, 2002

4. **During this period, how many hours/percent of time per month did your agency work on the Strategic Plan?**

?? Approx. 1 person half-time for project management
?? This reflects different staff with varying levels of effort over time

5. **Was consultant support used to develop the Strategic Plan?**

Yes__X__ No_____

If yes, please provide the consultant contract cost.

?? Approx. $500,000

6. **Briefly describe the driving force behind the development of the Strategic Plan.**

?? Caltrans has been forwarding ITS planning activities on a statewide basis for the past 5-10 years
?? The Sierra Nevada ITS effort is part of this on-going effort and will incorporate ITS activities as directed by the Transportation Efficiency Act for the 21st Century (TEA-21)

7. What were the primary goals and objectives of the Strategic Plan?

- ?? Bring together those stakeholders involved in planning, building, operating, and maintaining transportation systems to study whether ITS has potential application in the Sierra Nevada Region
- ?? Determine the best way to move forward with potential ITS deployments
- ?? Inventory current ITS assets in the study area
- ?? Identify transportation deficiencies and ITS opportunities
- ?? Identify and prioritize worthwhile ITS Projects
- ?? Coordinate with other California Statewide ITS efforts and those in neighboring states (Nevada)
- ?? Increase regional inter-agency communication
- ?? Better coordinate the transportation planning process between involved Agencies

8. Were any elements/features of the Strategic Plan emphasized/highlighted in greater detail? (For example ✍ was there an emphasis on the extension of a Metropolitan Area Strategic Plan, CVO, Public Safety, Operations and Maintenance, Roadway/Weather Management, etc.)

- ?? Special emphasis on ITS in rural, mountainous areas

9. How did the Strategic Plan determine its needs, challenges and opportunities?

- ?? Workshops/meetings with the ITS Steering Group and Local/Regional stakeholders
- ?? Workshops/meetings with Caltrans NTRP and District staff

10. Did the Strategic Plan include a Statewide/Regional ITS Architecture?

Yes__X__ No_____

If yes, what were the components/deliverables of this Regional ITS Architecture?

- ?? ITS Vision Statement
- ?? User Service Objectives
- ?? Other deliverables TBD

11. Did the Strategic Plan identify potential funding opportunities, sources, or plans/programs?

Yes __X__ No_____

If yes, please list the potential sources.

TBD

12. What is the status of incorporating any Strategic Plan projects into these sources?

TBD

13. Did the Strategic Plan consider operations, maintenance, and management activities?

Yes __X__ No_____

If yes, please briefly explain how these were considered.

TBD

14. Did the Strategic Plan identify costs and benefits associated with its selected ITS Projects?

Yes __X__ No_____

If yes, please briefly describe how.

TBD ✍ the level of detail and degree of analysis is unknown at this time

15. What benefits and/or lessons learned were realized by developing the Strategic Plan?

TBD ✍ but the importance of stakeholder involvement is a recurring lesson

16. What is the current status of the Strategic Plan?

?? Initial workshops/meetings with stakeholders have been held

?? Current efforts are focused on securing consensus on the ITS Vision Statement and User Service Objectives that will drive more detailed development of the Strategic Deployment Plan

South Dakota Rural ITS Deployment Plan

1. Contact: Name/Organization/Address/Phone

Jon Becker
South Dakota Department of Transportation
Office of Research
700 East Broadway Avenue
Pierre, SD 57501-2586
(605) 773-6242

2. Please list the primary agency stakeholders (public, private, academia) that were involved in developing the Strategic Plan.

?? South Dakota Department of Transportation (SDDOT)
?? Emergency Management
?? South Dakota Tourism
?? South Dakota Highway Patrol
?? Federal Highway Administration (FHWA)
?? South Dakota Association of County Commissioners
?? Bureau of Information and Telecommunication
?? City of Rapid City
?? City of Sioux Falls Department of Public Works

3. How long did the Strategic Plan take to develop?

?? Approx. 11 mos.

4. During this period, how many hours per month did your agency work on the Strategic Plan?

?? Approx. 80 hrs.

5. Was consultant support used to develop the Strategic Plan?

Yes__X___ No_____

If yes, please provide the consultant contract cost.

?? Approx. $115,000.

6. Briefly describe the driving force behind the development of the Strategic Plan.

?? Propose a deployment plan to guide the SDDOT in implementing ITS systems in an effort to improve traveler information, mobility, and safety

7. What were the primary goals and objectives of the Strategic Plan?

?? Describe the current rural ITS environment in South Dakota
?? Develop a strategic direction for ITS activities in South Dakota
?? Propose a coordinated program of rural ITS projects that address the needs of transportation users and those of government and public agencies
?? Define an organization and management framework for accomplishing ITS projects
?? Develop materials that will effectively communicate the findings to representatives of state government and other public agencies in South Dakota

8. Were any elements/features of the Strategic Plan emphasized/highlighted in greater detail? (For example ✍ was there an emphasis on the extension of a Metropolitan Area Strategic Plan, CVO, Public Safety, Operations and Maintenance, Roadway/Weather Management, etc.)

?? Rural implementations
?? Rural safety initiatives that address roadway crashes due to long emergency response times
?? Rural transit options

9. How did the Strategic Plan determine its needs, challenges and opportunities?

?? Eight (8) public agency and general public focus groups
?? Four (4) additional public agency outreach meetings
?? General public survey
?? Review of accident statistics and safety records
?? Review and assessment of current communications infrastructure

10. Did the Strategic Plan include a Statewide/Regional ITS Architecture?

Yes_____ No__X___

If yes, what were the components/deliverables of this Regional ITS Architecture?

11. Did the Strategic Plan identify potential funding opportunities, sources, or plans/programs?

Yes __X___ No_____

If yes, please list the potential sources.

?? State transportation funds
?? Federal Highway Administration (i.e., ITS, 5-1-1, & Mayday initiatives)
?? City contributions
?? Private partnerships

12. What is the status of incorporating any Strategic Plan projects into these sources?

?? A subset of high priority ITS projects is being considered for funding in the near future using State and Federal sources

13. Did the Strategic Plan consider operations, maintenance, and management activities?

Yes __X___ No_____

If yes, please briefly explain how these were considered.

?? Based on deployments of similar ITS endeavors, these activities were modified for deployment within South Dakota
?? Operations, maintenance, and management activities were considered on a project-level

14. Did the Strategic Plan identify costs and benefits associated with its selected ITS Projects?

Yes __X___ No_____

If yes, please briefly describe how.

?? Most of the recommended ITS projects were based on successful deployments in other states
?? Cost/benefits (C/B) were extrapolated from similar ITS projects that were reviewed

15. What benefits and/or lessons learned were realized by developing the Strategic Plan?

?? Rural areas contain a set of unique transportation-related needs that cannot easily be addressed by traditional design/build methods
?? The needs found in rural areas should be examined and addressed to ensure a consistent level-of-service for all roadways across the State

16. What is the current status of the Strategic Plan?

?? The final report was completed January, 2001
?? The South Dakota Department of Transportation is currently reviewing the plan to determine/recommend projects for implementation

Tahoe Basin ITS Strategic Plan (California & Nevada)

1. Contact: Name/Organization/Address/Phone

Nick Haven
Tahoe Regional Planning Agency (TRPA)
308 Dorla Court
P.O. Box 1038
Zephyr Cove, NV 89448
(775) 588-4547 Ext. 256

For more information, please visit the Tahoe Basin Internet web-site at:
http://www.tahoebasinits.com/

2. Please list the primary agency stakeholders (public, private, academia) that were involved in developing the Strategic Plan.

?? Tahoe Regional Planning Agency (TRPA)
?? Caltrans District 3
?? Caltrans New Technology & Research Program (NTRP)
?? Nevada DOT District 2
?? Nevada DOT Research Division
?? Federal Highway Administration (CA & NV)
?? California Highway Patrol (CHP)
?? Nevada Highway Patrol (NHP)
?? Washoe Regional Transportation Commission (RTC)
?? Tahoe Coordinated Area Transit (TCAT)
?? South Shore Transportation Management Association (TMA)
?? Truckee/North Tahoe Transportation Management Association (TNT TMA)
?? Tahoe Transportation District (TTD)
?? Lake Tahoe Transportation & Water Quality Coalition
?? United States Forest Service (USFS)

3. How long did the Strategic Plan take to develop?

?? Project is still in-progress ✍ duration approx. 18 mos.
?? Start ✍ June, 2000
?? End ✍ December, 2001

4. During this period, how many hours per month did your agency work on the Strategic Plan?

?? Approx. 24 hrs. per month

5. Was consultant support used to develop the Strategic Plan?

Yes__X___ No_____

If yes, please provide the consultant contract cost.

?? Approx. $330,000

6. Briefly describe the driving force behind the development of the Strategic Plan.

- ?? Caltrans has been forwarding ITS planning activities on a statewide basis for the past 5-10 years
- ?? Nevada DOT has begun similar ITS planning efforts in key regions & corridors
- ?? TRPA was recently designated as the Tahoe Basin's metropolitan planning organization (MPO)
- ?? Understanding that the Tahoe Basin is a major tourist destination and recognizing the need to coordinate its ITS activities with those of neighboring regions/corridors
- ?? Address the unique aspects of the rural environment where challenges include rapid changes in weather, limited alternative routes and difficulties in developing effective communication systems

7. What were the primary goals and objectives of the Strategic Plan?

- ?? Preserve the health of the Tahoe Basin's natural environment (especially Lake Tahoe itself)
- ?? Improve the Basin's economic vitality and tourism activities
- ?? Increase roadway efficiency without adding new lanes or roads
- ?? Address congestion, safety, and incident management challenges
- ?? Improve the effectiveness of Agency operation, maintenance, and emergency response activities

8. Were any elements/features of the Strategic Plan emphasized/highlighted in greater detail? (For example ✍ was there an emphasis on the extension of a Metropolitan Area Strategic Plan, CVO, Public Safety, Operations and Maintenance, Roadway/Weather Management, etc.)

- ?? Provide pre-trip and en-route traveler information
- ?? Increase the efficiency of the Basin's transit systems
- ?? Improve roadway maintenance activities (especially during the winter season)
- ?? Improve inter-agency coordination and management activities

9. How did the Strategic Plan determine its needs, challenges and opportunities?

- ?? Conducted comprehensive system inventory and transportation assessment
- ?? Conducted one-on-one interviews with key stakeholders
- ?? Held several workshops and focus group meetings with Agency stakeholders

10. Did the Strategic Plan include a Statewide/Regional ITS Architecture?

Yes_X___ No_____

If yes, what were the components/deliverables of this Regional ITS Architecture?

- ?? User Service Plan
- ?? Market Package Plan
- ?? Physical Architecture (Existing & Planned)
  - ?? Tailored "sausage" diagrams (subsystem interconnect diagrams)
  - ?? Includes links to associated Market Packages & ITS Projects
- ?? Turbo Architecture Database File (Existing & Planned)
  - ?? System Inventory
  - ?? Market Package Association
  - ?? Organizational Architecture (tailored subsystem interconnect diagrams)
  - ?? Architecture Flow Diagrams (tailored data flow diagrams between subsystems)

11. Did the Strategic Plan identify potential funding opportunities, sources, or plans/programs?

Yes _X____ No_____

If yes, please list the potential sources.

- ?? At this time, that portion of the project has not been undertaken
- ?? However, it is the intent of the project to successfully identify all tangible/feasible funding sources

12. What is the status of incorporating any Strategic Plan projects into these sources?

?? Internal Agency budgets for Caltrans, Nevada DOT, FHWA, and TCAT already include monies for ITS systems in/around the Tahoe Basin
?? TRPA is also in the process of forwarding several ITS components into the Regional Transportation Improvement Plan (RTIP)
?? TCAT is a finalist for being selected as an USDOT ITS transit demonstration project in the Basin (grant monies have already been obtained)

13. Did the Strategic Plan consider operations, maintenance, and management activities?

Yes _X___ No_____

If yes, please briefly explain how these were considered.

?? O&M needs identified/assessed during stakeholder interviews/workshops
?? Preliminary analysis of staff capabilities vs. ITS requirements
?? Stakeholders discussed/compared existing roles, Agency interactions, and type of information sharing to desired levels

14. Did the Strategic Plan identify costs and benefits associated with its selected ITS Projects?

Yes _X____ No_____

If yes, please briefly describe how.

?? At this time, that portion of the project has not been undertaken
?? However, it is the intent of the project to successfully identify ITS project costs and benefits

15. What benefits and/or lessons learned were realized by developing the Strategic Plan?

?? Importance of public agencies working with the private sector (e.g., casinos, ski resorts, lodging associations, etc.) to identify potential ITS solutions that promote economic vitality in the Basin
?? Funding for ITS does not just exist in some "magical pot-of-money"; but rather, ITS needs to be "mainstreamed" into the traditional planning process
?? TRPA staff will be responsible for updating the Regional ITS Architecture and for ensuring conformance when "new" ITS Projects arise

16. What is the current status of the Strategic Plan?

?? Developing the Market Package Plan (February, 2001)
?? Completed the "Existing" Regional ITS Architecture using Turbo Architecture (February, 2001)
?? Identifying ITS project "Early Winners" (March, 2001)

Tahoe Gateway Counties ITS Strategic Deployment Plan (California)

1. **Contact: Name/Organization/Address/Phone**

   Kathy Mathews
   Placer County Transportation Planning Agency (PCTPA)
   550 High Street, Suite 107
   Auburn, CA 95603
   (530) 823-4033

   For more information, please visit the Tahoe Gateway Counties Internet web-site at:
   http://www.tahoegateway.com/sys-tmpl/door/

2. **Please list the primary agency stakeholders (public, private, academia) that were involved in developing the Strategic Plan.**

   ?? Placer County Transportation Planning Agency (PCTPA)
   ?? El Dorado County Transportation Commission (EDCTC)
   ?? Sierra County Transportation Commission (SCTC)
   ?? Nevada County Transportation Commission (NCTC)
   ?? Caltrans District 3
   ?? Caltrans New Technology & Research Program (NTRP)
   ?? California Highway Patrol (CHP)
   ?? California Department of Tourism
   ?? El Dorado Transit
   ?? National Weather Service (NWS)
   ?? United States Forest Service (USFS)
   ?? Truckee/North Tahoe Transportation Management Association (TNT TMA)
   ?? AMTRAK

3. **How long did the Strategic Plan take to develop?**

   ?? Project is still in-progress ✍ duration approx. 30 mos.
   ?? Start ✍ February, 2000
   ?? End ✍ June, 2002

4. **During this period, how many hours per month did your agency work on the Strategic Plan?**

   ?? Approx. 20 hrs. per month

5. **Was consultant support used to develop the Strategic Plan?**

   Yes_X___ No_____

   If yes, please provide the consultant contract cost.

   ?? Approx. $315,000

6. **Briefly describe the driving force behind the development of the Strategic Plan.**

   ?? Caltrans has been forwarding ITS planning activities on a statewide basis for the past 5-10 years
   ?? Need transportation improvements to better serve residents/visitors traveling to the numerous recreational/tourist destinations in the region
   ?? The needs of the rapidly urbanizing foothills, the numerous state routes, and the heavily traveled I-80 corridor has added pressure to the existing transportation systems
   ?? Need to coordinate its ITS activities with those of neighboring regions/corridors

7. What were the primary goals and objectives of the Strategic Plan?

?? Develop an ITS deployment plan and implementation strategy for the Tahoe Gateway Region
?? Improve safety and enhancing the capacity of the existing transportation facilities through more effective management and operation of the transportation system
?? Address the unique aspects of the rural environment where challenges include rapid changes in weather, limited alternative routes and difficulties in developing effective communication systems
?? Promote accessibility to the region's numerous recreational/tourist destinations
?? Provide better traveler information to the region's residents/visitors

8. Were any elements/features of the Strategic Plan emphasized/highlighted in greater detail? (For example ✍ was there an emphasis on the extension of a Metropolitan Area Strategic Plan, CVO, Public Safety, Operations and Maintenance, Roadway/Weather Management, etc.)

?? Transit operations
?? Traveler information systems/services
?? Road Weather Information Systems (RWIS)
?? Roadway safety aspects

9. How did the Strategic Plan determine its needs, challenges and opportunities?

?? Conducted comprehensive system inventory and transportation assessment
?? Sent-out questionnaires/survey forms to Agency stakeholders
?? Conducted one-on-one interviews with key stakeholders
?? Held several workshops with Agency stakeholders

10. Did the Strategic Plan include a Statewide/Regional ITS Architecture?

Yes_X___ No_____

If yes, what were the components/deliverables of this Regional ITS Architecture?

?? User Service Plan (February, 2001)
?? Market Package Plan (September, 2001)
?? Regional ITS Architecture using Turbo Architecture (February, 2002)

11. Did the Strategic Plan identify potential funding opportunities, sources, or plans/programs?

Yes _X____ No_____

If yes, please list the potential sources.

?? Planned effort

12. What is the status of incorporating any Strategic Plan projects into these sources?

?? TBD

13. Did the Strategic Plan consider operations, maintenance, and management activities?

Yes _X____ No_____

If yes, please briefly explain how these were considered.

?? Planned effort

14. Did the Strategic Plan identify costs and benefits associated with its selected ITS Projects?

Yes _____ No__X___

If yes, please briefly describe how.

?? Cost/Benefit (C/B) analyses not planned

15. What benefits and/or lessons learned were realized by developing the Strategic Plan?

?? TBD

16. What is the current status of the Strategic Plan?

?? Finalizing the User Service Plan (February, 2001)

Tennessee Department of Transportation ITS Strategic Plan

1. Contact: Name/Organization/Address/Phone

Don Dahlinger
ITS Office
Tennessee Department of Transportation
505 Deaderick St.
Suite 1000
Nashville, TN 37219
(615) 741-3033

2. Please list the primary agency stakeholders (public, private, academia) that were involved in developing the Strategic Plan.

?? Tennessee Department of Transportation (TDOT)
?? Federal Highway Administration (FHWA)
?? Vanderbilt University
?? Strategic Plan was also distributed to over 200 internal and external stakeholders across the state

3. How long did the Strategic Plan take to develop?

?? Approx. 17 mos.
?? Start: January, 1997
?? End: May, 1998
?? However, development of the Strategic Plan only became a priority in January, 1998

4. During this period, how many hours per month did your agency work on the Strategic Plan?

?? Approx. 50 staff-hours per mo.
?? Includes ITS Coordinating Committee meetings and preparation (2x per mo.)

5. Was consultant support used to develop the Strategic Plan?

Yes__X___ No_____

If yes, please provide the consultant contract cost.

?? Approx. $100,000 (from Federal Interstate Maintenance funds)

6. Briefly describe the driving force behind the development of the Strategic Plan.

?? The TDOT Executive Leadership Team (ELT) felt the need for guidance on implementing ITS programs and practices within TDOT
?? They also saw a need to proactively deal with ITS-related requests from local governments and private interests

7. What were the primary goals and objectives of the Strategic Plan?

?? Inform the public of TDOT's current ITS activities and anticipated strategic direction
?? Improve operating efficiency
?? Improve safety
?? Reduce congestion
?? Improve reliability
?? Improve access, availability, and quality of planning information

8. Were any elements/features of the Strategic Plan emphasized/highlighted in greater detail? (For example ✍ was there an emphasis on the extension of a Metropolitan Area Strategic Plan, CVO, Public Safety, Operations and Maintenance, Roadway/Weather Management, etc.)

?? Incident Management
?? Operations and Maintenance

9. How did the Strategic Plan determine its needs, challenges and opportunities?

?? **Down-selected from the National ITS Program Plan's list of User Services to those which would be applicable to TDOT's overall mission**
?? **Developed a matrix to map needs (e.g. detection and verification time, severe weather, volume-to-capacity ratio, etc.) to potential ITS technology applications**
?? **In order to identify specific locations, TDOT's overall mission objectives were mapped to key parameters, which were in turn mapped to ideal measures of performance**

10. Did the Strategic Plan include a Statewide/Regional ITS Architecture?

Yes__X___ No_____

If yes, what were the components/deliverables of this Regional ITS Architecture?

?? ITS Master Plans
    ?? Market Packages
    ?? Deployment Plan
    ?? Cost Estimates (Capital & O&M)
    ?? Regional ITS Architecture
?? Regional ITS Architecture
    ?? Operational Concept
    ?? System Functional Requirements (e.g. Market Packages
    ?? Diagram illustrating high-level interfaces
    ?? Diagrams illustrating ITS Architecture Flows
    ?? List of applicable ITS standards

11. Did the Strategic Plan identify potential funding opportunities, sources, or plans/programs?

Yes _____ No__X__

If yes, please list the potential sources.

?? The plan does not address funding specifically, but does include strategic priorities focused on addressing the issue of funding
?? However, currently using Federal funds for ITS projects

12. What is the status of incorporating any Strategic Plan projects into these sources?

?? Currently waiting for the FHWA proposed rule-making for guidance

13. Did the Strategic Plan consider operations, maintenance, and management activities?

Yes __X___ No_____

If yes, please briefly explain how these were considered.

?? Developed three (3) specific O&M strategic priorities
    ?? Develop training programs for ITS stakeholders on maintenance, operations, contracting, procurement, and management issues to ensure knowledge development efforts
    ?? Ensure funding for ITS infrastructure O&M is considered
    ?? Provide appropriate resources to support ITS deployments on an on-going basis
?? Ensure that O&M remains a focus for both the ITS Coordinating Committee and the ELT

14. Did the Strategic Plan identify costs and benefits associated with its selected ITS Projects?

Yes __X___ No_____

If yes, please briefly describe how.

?? Costs are being developed through the urban area master plan development process
?? Consideration of benefits has been very qualitative through providing example benefits from ITS deployments in other states

15. What benefits and/or lessons learned were realized by developing the Strategic Plan?

?? Since ITS technology and practices are evolving so quickly and given the newness of ITS in TDOT, having an ongoing strategic planning process is as important or more important than having a written plan
?? A short-term (annual) plan update is a necessary undertaking
    ?? Documents current objectives and holds people accountable for ITS initiatives that have been implemented
    ?? Provides a vehicle for communicating current ITS activities with other stakeholders
?? The strategic planning process needs to involve relatively high-level management so that ITS program impacts can be fully understood across the organization
?? Communication and coordination of ITS initiatives are important to long-term success of the program
?? The plan should focus on a timeline for implementation

16. What is the current status of the Strategic Plan?

?? ITS Steering Committee performing annual updates of the plan
?? Current ITS deployments include the following
    ?? Freeway management systems (Nashville & Knoxville)
    ?? Commercial Vehicle Ope5ratiopns (CVO) pre-clearance systems
    ?? Traveler information kiosks at welcome centers and rest areas

Vermont ITS Strategic Plan

1. **Contact: Name/Organization/Address/Phone**

   Bruce Bender
   Vermont Agency of Transportation
   (802) 828-3984

   Karen Songhurst
   Vermont Agency of Transportation
   (802) 828-1078

   Dr. Adel Sadek
   Assistant Professor
   Civil Engineering Department
   University of Vermont
   (802) 656-4126

2. **Please list the primary agency stakeholders (public, private, academia) that were involved in developing the Strategic Plan.**

   ?? Vermont Agency of Transportation
   ?? University of Vermont

3. **How long did the Strategic Plan take to develop?**

   ?? Development of the Vermont ITS Strategic Plan is currently underway
   ?? The study should take 12 months

4. **During this period, how many hours/percent of time per month did your agency work on the Strategic Plan?**

   ?? For the University of Vermont, 2.5 man-months

5. **Was consultant support used to develop the Strategic Plan?**

   Yes__X___ No_____

   If yes, please provide the consultant contract cost.

   ?? Approx. $30,000

6. **Briefly describe the driving force behind the development of the Strategic Plan.**

   ?? The Vermont Agency of Transportation has relatively little experience deploying ITS and wanted to develop a comprehensive/systematic approach from which to establish a foundation
   ?? Incorporate City of Burlington ITS Strategic Plan into Statewide version

7. **What were the primary goals and objectives of the Strategic Plan?**

   ?? Determine the appropriate applications for ITS in the State of Vermont

8. **Were any elements/features of the Strategic Plan emphasized/highlighted in greater detail? (For example ✍ was there an emphasis on the extension of a Metropolitan Area Strategic Plan, CVO, Public Safety, Operations and Maintenance, Roadway/Weather Management, etc.)**

   ?? Rural needs
   ?? Emergency Management Systems (EMS)
   ?? Public Safety activities (Police and Fire)

9. How did the Strategic Plan determine its needs, challenges and opportunities?

?? Meetings with the Steering Committee & District Engineers
?? Conducted stakeholder surveys
    ?? City of Burlington
    ?? EMS community
    ?? Police
    ?? Burlington MPO

10. Did the Strategic Plan include a Statewide/Regional ITS Architecture?

Yes__X___No_____

If yes, what were the components/deliverables of this Regional ITS Architecture?

?? User Needs Plan
?? User Services
?? Market Packages Report
?? Long-Range Vision
?? Regional ITS Architecture
?? Applicable ITS standards
?? Description of potential ITS Projects
?? Suggested procurement methods

11. Did the Strategic Plan identify potential funding opportunities, sources, or plans/programs?

Yes ___X__ No_____

If yes, please list the potential sources.

?? Specific findings still to be determined

12. What is the status of incorporating any Strategic Plan projects into these sources?

?? Specific findings still to be determined

13. Did the Strategic Plan consider operations, maintenance, and management activities?

Yes __X___ No_____

If yes, please briefly explain how these were considered.

?? Not initially, they will be considered in the B/C analysis at a high level

14. Did the Strategic Plan identify costs and benefits associated with its selected ITS Projects?

Yes __X___ No_____

If yes, please briefly describe how.

?? Specific findings still to be determined

15. What benefits and/or lessons learned were realized by developing the Strategic Plan?

?? Coordination and cooperation between all involved Stakeholders is essential to the project's success

16. What is the current status of the Strategic Plan?

?? Approx. 65% complete (March, 2001)

Smart Travel Business Plan (Virginia)

1. Contact: Name/Organization/Address/Phone

Tom Jennings
Federal Highway Administration
Virginia Division
(804) 775-3357

2. Please list the primary agency stakeholders (public, private, academia) that were involved in developing the Strategic Plan.

?? Virginia Department of Transportation (VDOT)
?? Federal Highway Administration (FHWA)
?? Local city/county transportation agencies
?? Neighboring state transportation agencies
?? Metropolitan Planning Organizations (MPOs)
?? Universities
?? ITS Virginia (Member agencies)

3. How long did the Strategic Plan take to develop?

?? VDOT does not consider ITS planning to just be the development of one document; it is a continuous effort
?? Efforts are on-going and have been underway for 7 years and will continue for many more years
?? VDOT has several on-going efforts underway to develop ITS activities statewide, including the major rural areas of the state (i.e., major metro areas and rural Virginia along the I-81 corridor)
?? The Smart Travel Business Plan (1998) is probably the closest document that provides an overall ITS strategic approach on a statewide basis
?? Overall, there are several ongoing Federal-aid projects which provide funding for ITS planning activities

4. During this period, how many hours/percent of time per month did your agency work on the Strategic Plan?

N/A

5. Was consultant support used to develop the Strategic Plan?

Yes__X_ No_____

If yes, please provide the consultant contract cost.

?? The ongoing VDOT contracts that include ITS planning are for several million dollars

6. Briefly describe the driving force behind the development of the Strategic Plan.

?? There is a definite recognition and top-level support for using technology to improve transportation in the State of Virginia

7. What were the primary goals and objectives of the Strategic Plan?

?? The Northern Virginia (NOVA) Smart Travel Program can be described as ten (10)inter-related systems that work together:
    ?? Planning and Policy
    ?? Surface Street Management
    ?? Freeway Management
    ?? Incident Management

- ?? Multi-modal Support
- ?? Customer Service
- ?? Communications
- ?? Traveler Information
- ?? Asset Management
- ?? Payment System

?? Each of the above systems has four (4) primary program activities:

- ?? **System Management**
- ?? System Expansion
- ?? System Evaluation
- ?? System Upgrade

?? VDOT strategy ✍ Vision to Goals to Objectives to Functions to Long-Range ITS Projects

- ?? Vision ✍ VDOT will provide timely and accurate information about roadway conditions to travelers (System Management, Personal Travel, Commercial Vehicle Operations)
- ?? Goals ✍ Support traveler information services
- ?? Objectives ✍ Improve roadway network information dissemination
- ?? Functions ✍ Provide information to travelers on current status of network and share information with other agencies

System Management Program

Current Program (0-2 Years)

- ?? Maximize investment in existing ATMS resources
- ?? Expand ATMS coverage to meet current needs
- ?? Coordinate ITS with other administrative technology initiatives within VDOT
- ?? Balance urban and rural applications
- ?? Develop communications and architecture to support future expansion
- ?? Strengthen working relationships

Near term (3-5 years)

- ?? Begin widespread deployment of near real-time traffic control
- ?? Continue to expand ATMS coverage to meet needs
- ?? Expand focus on administration and asset management systems
- ?? Implement Integrated VDOT data Sharing

Personal Travel Program

Current Program (0-2 Years)

- ?? Develop Washington DC and Hampton Roads Region ATIS Public Private Partnerships
- ?? Begin Statewide ATIS program development
- ?? Implement tourist travel enhancement

Near Term (3-5 years)

- ?? Implement Statewide ATIS Program

Commercial Vehicle Operations Program

Current Program (0-2 years)

- ?? Develop paperless administrative and clearance systems
- ?? Increase electronic communications links
- ?? Reduce on-road commercial vehicle stop time
- ?? Begin CVISN deployment

Near Term (3-5 years)

- ?? Complete paperless systems
- ?? Develop systems that are completely accessible electronically
- ?? Install electronic fund transfers for all fees
- ?? Begin using electronic data to target safety activities
- ?? Reduce number of vehicles stopped on roads

Specific Rural Projects

- ?? Head –on traffic Warning System and Evaluation
- ?? Evaluation of Cellular Call Locating System
- ?? Work Zone Safety Systems – low cost route diversion study, Mayday System, Uniform Incident Response and Dispatch Protocol Update
- ?? Enhanced Traveler Information System

8. Were any elements/features of the Strategic Plan emphasized/highlighted in greater detail? (For example ✍ was there an emphasis on the extension of a Metropolitan Area Strategic Plan, CVO, Public Safety, Operations and Maintenance, Roadway/Weather Management, etc.)

?? I-81 Concept of ITS Operations Plan (Rural ITS Project)
?? In addition, a separate ITS CVO business plan was developed (May, 1998)

9. How did the Strategic Plan determine its needs, challenges and opportunities?

?? This is a continuous effort to seek input from the many partners and stakeholders

10. Did the Strategic Plan include a Statewide/Regional ITS Architecture?

Yes__X___ No_____

If yes, what were the components/deliverables of this Regional ITS Architecture?

- ?? User Services Report
- ?? Development of the ITS "Vision"
  - ?? Describes the outcome of implementing the ITS Business Plan
  - ?? Key areas include System Management, Personal Travel, and Commercial Vehicle Operations
- ?? Statewide ITS Concept – Deployment Approach
- ?? Statewide ITS Architecture
- ?? CVO Business Plan
- ?? SMART Business Plan
- ?? Elements of the plan that help describe how the VDOT ITS Program will be implemented include:
  - ?? Performance Measure
  - ?? Guiding Principles
  - ?? Deployment Approach
  - ?? Migration Paths
- ?? VDOT has implemented several ITS Systems to address specific needs in non-urban areas including fog detection and warning systems, intersection warning systems, and road weather information systems

11. Did the Strategic Plan identify potential funding opportunities, sources, or plans/programs?

Yes _____ No__X___

If yes, please list the potential sources.

12. What is the status of incorporating any Strategic Plan projects into these sources?

N/A

13. Did the Strategic Plan consider operations, maintenance, and management activities?

Yes _X__ No_____

If yes, please briefly explain how these were considered.

?? Included as part of VDOT's System Management User Services Group under Administrative Functions and Asset Management
?? VDOT's goal is to maintain and operate its assets to the highest standards of quality and safety

14. Did the Strategic Plan identify costs and benefits associated with its selected ITS Projects?

Yes _____ No__X___

If yes, please briefly describe how.

15. What benefits and/or lessons learned were realized by developing the Strategic Plan?

?? Having an overall vision is very important and the VDOT Smart Travel Business Plan serves that purpose
?? However, there is a great deal more involved in planning for ITS ✍ it is a continuous effort and not a one-shot activity

16. What is the current status of the Strategic Plan?

?? Efforts continue to be underway ✍ the 2001 update is almost complete (June, 2001)
?? The next specific document planned is a Statewide VDOT Implementation Plan
    ?? Includes an Integration Strategy and Investment Plan
    ?? Each District will also be developing Program Plans

Southwest Wisconsin ITS Architecture & Traffic Management System Preliminary Engineering Project

1. Contact: Name/Organization/Address/Phone

Mr. Jay Obenberger
Wisconsin Department of Transportation – District 1
2101 Wright Street
Madison, Wisconsin 53704
(608) 243-3379

2. Please list the primary agency stakeholders (public, private, academia) that were involved in developing the Strategic Plan.

- ?? City of Madison*
- ?? UW Madison
- ?? Madison Convention & Visitor's Bureau
- ?? Madison Suburbs
  - ?? Fitchburg
  - ?? McFarland
  - ?? Middleton
  - ?? Monona
  - ?? Oregon
  - ?? Sun Prairie
  - ?? Verona
- ?? Other Cities
  - ?? Beloit *
  - ?? Janesville*
  - ?? Wisconsin Dells
  - ?? Watertown
- ?? Dane County*
- ?? Rock County*
- ?? Jefferson County
- ?? Dodge County
- ?? Columbia County
- ?? Sauk County
- ?? Iowa County
- ?? Grant County
- ?? Lafayette County
- ?? Green County
- ?? WisDOT Bureau of Highway Operations*
- ?? WisDOT Bureau of Planning
- ?? WisDOT State Patrol District 1*
- ?? WisDOT State Patrol Bureau of Communications*
- ?? IDOT District 2 – Dixon*
- ?? Illinois State Toll Highway Authority*
- ?? Illinois State Police*
- ?? BadgerNet
- ?? I-90/94 Corridor ITS
- ?? I-39 Corridor ITS
- ?? Wisconsin Transportation Districts 1,4,5,6,7* (WisDOT)

* ✍ *Indicates a Primary Stakeholder*

3. How long did the Strategic Plan take to develop?

- ?? Approx. 18 mos
- ?? Start ✍ June, 2000
- ?? End ✍ November, 2001

4. During this period, how many hours per month did your agency work on the Strategic Plan?

- ?? Approx. 120 hrs. per month

5. Was consultant support used to develop the Strategic Plan?

Yes___X__ No_____

If yes, please provide the consultant contract cost.

- ?? Approx. $850,000
- ?? Please note that this amount includes preliminary engineering for high priority ITS Projects

6. Briefly describe the driving force behind the development of the Strategic Plan.

- ?? WisDOT has been leading an incident management program for the Dane County area for approx. 3 years
- ?? The Dane County Incident Management Steering Committee realized that an ITS Strategic Plan was necessary for the Dane County Area and that the project region needed to be expanded to the surrounding 10 Counties in Southwest Wisconsin (which are included in WisDOT's Transportation District 1)
- ?? WisDOT District 1 acts as a centroid for the freeway system within western Wisconsin and the Interstate Corridors needed a leading District for the further deployment of ITS
- ?? Many of the stakeholders within the 10 County area were already planning and in some cases implementing projects with ITS elements
- ?? There is currently not a Regional Transportation Planning Agency (RTPA) for this region of Wisconsin and WisDOT is currently taking the role as the coordinator for ITS and the initial "keeper" of the Regional ITS Architecture

7. What were the primary goals and objectives of the Strategic Plan?

- ?? Develop an overall ITS Vision for Southwest Wisconsin
- ?? Document a Regional ITS Architecture
- ?? Conduct Region-wide ITS Outreach and Education activities
- ?? Identify Regional needs and propose solutions
- ?? Develop Stakeholder Consensus on needs and proposed solutions
- ?? Develop and gain approval for a 6-Year ITS Program Plan

8. Were any elements/features of the Strategic Plan emphasized/highlighted in greater detail? (For example ✍ was there an emphasis on the extension of a Metropolitan Area Strategic Plan, CVO, Public Safety, Operations and Maintenance, Roadway/Weather Management, etc.)

- ?? Rural transportation needs
- ?? Traveler information
- ?? Public Safety data sharing and integration

9. How did the Strategic Plan determine its needs, challenges and opportunities?

- ?? Interviewed over 50 Local Agencies in the following stakeholder categories:
  - ?? Engineering Departments
  - ?? Public Works & Maintenance Staff
  - ?? 911 Centers & Emergency Management Personnel
  - ?? Communications Departments
  - ?? Fire and Emergency Medical Services (EMS)

- ?? Law Enforcement, Sheriff, and local Police Departments
- ?? Metropolitan Planning Organizations (MPOs)
- ?? Transit Agencies

?? Conducted system inventory and transportation assessment

?? Conducted one-on-one interviews with majority of stakeholders to discuss the ITS Program and define existing and future systems

?? Conducted multiple workshops for different areas within the Region

?? Conducted a series of prioritizing exercises at monthly Technical Meetings

10. Did the Strategic Plan include a Statewide/Regional ITS Architecture?

Yes__X__ No_____

If yes, what were the components/deliverables of this Regional ITS Architecture?

?? **A series of documents highlighting the Systems Engineering process**

?? Turbo Architecture Database File (Existing & Planned)

- ?? System Inventory
- ?? Market Package Association
- ?? Physical Architecture
- ?? Organizational Architecture (tailored subsystem interconnect diagrams)
- ?? **Architecture Flow Diagrams (tailored data flow diagrams between subsystems)**

11. Did the Strategic Plan identify potential funding opportunities, sources, or plans/programs?

Yes __X___ No_____

If yes, please list the potential sources.

?? The Strategic Plan will identify a 6-10 year deployment plan and associated funding opportunities

?? WisDOT has taken initial steps to "mainstream" ITS components into many traditional roadway improvement projects

?? However, the funding opportunities will ultimately be broken into several categories:

- ?? National Highway System (NHS) funds
- ?? Surface Transportation Program (STP)
- ?? Federal Transit Administration (FTA) monies
- ?? Traffic Impact Mitigation ✍ typically 10% of overall traditional highway project costs
- ?? Federal Earmarks
- ?? Mainstream vs. stand-alone ITS Projects

12. What is the status of incorporating any Strategic Plan projects into these sources?

?? The Consultant Team is currently in the process of mapping projects to potential funding opportunities

13. Did the Strategic Plan consider operations, maintenance, and management activities?

Yes __X___ No_____

If yes, please briefly explain how these were considered.

?? WisDOT seems to have an easier time justifying capitol expenditures versus recurring O&M costs

?? There are three (3) primary issues related to O&M:

- ?? Should WisDOT co-locate operations with any stakeholders (e.g., Dane County 911. State Patrol, City of Madison Traffic, etc.)?

- ?? How will ITS component O&M be handled across established jurisdictional boundaries (i.e., across Illinois state line and beyond District 1)?
- ?? Should WisDOT charge agencies, private companies, and/or citizens for any data such as video images, travel times, etc.?

14. Did the Strategic Plan identify costs and benefits associated with its selected ITS Projects?

Yes __X___ No_____

If yes, please briefly describe how.

- ?? The projects will be assigned costs through the development of the 6-10 year implementation plan
- ?? The benefits were measured using an evaluation methodology based on various weighted performance criteria (e.g., crashes, LOS, trip predictability, etc.)
- ?? Projects that ranked high in the evaluation methodology will likely be the first projects deployed

15. What benefits and/or lessons learned were realized by developing the Strategic Plan?

- ?? Through aggressive outreach and education, Wisconsin is starting to build a consortium of Agencies that support ITS applications
- ?? WisDOT has invested significant resources towards meeting with regional stakeholders.
  - ?? It is critical to have at least one (1) WisDOT representative accompany the Consultant Team to each stakeholder meeting
  - ?? This helps build internal support for ITS
  - ?? It also shows the participating Agency that WisDOT is committed to addressing stakeholder ITS related needs and issues

16. What is the current status of the Strategic Plan?

- ?? The project is currently in its 10th month
- ?? Initial draft architecture documents will be published in early April, 2001
- ?? Initial Preliminary Engineering Documents will be published in June, 2001
- ?? Under a recent contract amendment, the project area has been extended south into Illinois to include the Metro Rockford Area (i.e., Winnebago, Boone, De Kalb and Ogle Counties)

Wyoming Statewide ITS Strategic Plan

1. Contact: Name/Organization/Address/Phone

Jim Gaulke
ITS Coordinator
Wyoming Department of Transportation
PO Box 1708
Cheyenne, WY 82003-1708
(307) 777-4375

2. Please list the primary agency stakeholders (public, private, academia) that were involved in developing the Strategic Plan.

?? Wyoming Department of Transportation
?? City/County representatives
?? State and Local law enforcement agencies
?? Bureau of Land Management
?? National Forest Service
?? Private trucking, mining, and timber interests
?? Emergency service organizations
?? State Department of Tourism

3. How long did the Strategic Plan take to develop?

?? Approx. 18 mos.
?? Start ✍ April, 2000
?? End ✍ October, 2001

4. During this period, how many hours per month did your agency work on the Strategic Plan?

?? As this project is still on-going, the costs/resources to develop the plan have not yet been determined

5. Was consultant support used to develop the Strategic Plan?

Yes__X___ No_____

If yes, please provide the consultant contract cost.

?? Approx. $275,000

6. Briefly describe the driving force behind the development of the Strategic Plan.

?? Wyoming is surrounded by states that have developed ITS strategic plans, and they want to work with those states to develop regional solutions
?? Wyoming has several ongoing ITS activities [i.e., ITS/CVO, Greater Yellowstone Region ITS (GYRITS)] that they wish to coordinate
?? Wyoming is seeking to improve transportation efficiency and safety using advanced technologies

7. What were the primary goals and objectives of the Strategic Plan?

?? Increased safety and a significant decrease in the number of serious/fatal crashes
?? A seamless, unobtrusive system that will provide its customers with comprehensive, credible, and timely traveler information
?? ITS solutions mainstreamed into the planning and project development processes
?? Increased operational efficiency
?? Improvements to Wyoming's communications network to facilitate the effective integration of systems and the management of data
?? Optimum levels of well-trained staff to manage these systems
?? A system that is flexible to address emerging technologies and changing transportation requirements

8. Were any elements/features of the Strategic Plan emphasized/highlighted in greater detail? (For example ✍ was there an emphasis on the extension of a Metropolitan Area Strategic Plan, CVO, Public Safety, Operations and Maintenance, Roadway/Weather Management, etc.)

?? Rural ITS
?? Traveler information
?? Road Weather Information Systems (RWIS) management

9. How did the Strategic Plan determine its needs, challenges and opportunities?

?? Series of outreach meetings and workshops with many communities and agencies

10. Did the Strategic Plan include a Statewide/Regional ITS Architecture?

Yes__X__ No_____

If yes, what were the components/deliverables of this Regional ITS Architecture?

?? Statewide physical architecture (i.e., modified "sausage" diagrams)

11. Did the Strategic Plan identify potential funding opportunities, sources, or plans/programs?

Yes _____ No__X___

If yes, please list the potential sources.

?? Funding opportunities have not been explored yet
?? They will be considered during 2001

12. What is the status of incorporating any Strategic Plan projects into these sources?

?? This has not yet been determined because there have not been any ITS projects identified yet

13. Did the Strategic Plan consider operations, maintenance, and management activities?

Yes _____ No__X___

If yes, please briefly explain how these were considered.

?? Operations and Maintenance of ITS systems will be investigated in Phase II

14. Did the Strategic Plan identify costs and benefits associated with its selected ITS Projects?

Yes __X___ No_____

If yes, please briefly describe how.

?? The project will identify costs and benefits for specific projects, but is not at that stage yet.

15. What benefits and/or lessons learned were realized by developing the Strategic Plan?

?? ITS has become much more accepted in rural areas ✍ many towns in Wyoming are anxious to see ITS deployed
?? Financial constraints will play a factor in Wyoming ITS deployment
?? The size of Wyoming and its low population density will make many ITS solutions a challenge to operate and maintain

16. What is the current status of the Strategic Plan?

?? The Statewide ITS Strategic Plan is being conducted in two (2) phases and is scheduled to be completed September, 2001
?? Phase I Activities (complete)
    ?? Outreach & education activities
    ?? Information gathering
?? Phase II Activities
    ?? Began January, 2001
    ?? Inventory of existing ITS and technology in the state
    ?? Define statewide ITS needs
    ?? Identify priority ITS corridors
    ?? Define ITS projects and performance measures
    ?? Developing a statewide ITS architecture

Appendix C

Case Study and Survey Form Results Summary

	ITEM	Arizona	CA: COAST	CA: Central Coast	Colorado	Kansas	Minnesota
1.	Plan Title	Strategic Plan for Statewide Deployment of Intelligent Transportation Systems	California/Oregon Advanced Transportation Systems	Central Coast ITS Strategic Plan	ITS Strategic Work Plan	Kansas Statewide ITS Plan	Minnesota Guidestar*
2.	Project Start and End Dates	Oct 1997 - Dec 1998	1998 – 2000	Jan 1999 - Jun 2000	Completed October 1998	Completed March 2000	Completed in 1992
3.	Strategic Focus Areas	Identify rural transportation needs (statewide) and develop ITS solutions for those needs.	Unify member agencies and focus on a seamless, state-of-the art, multi-modal transportation network.	Identify needs and opportunities, select Market Packages, develop regional ITS architecture, and recommend ITS projects.	Provide vision for ITS in Colorado and to provide guidance for decisions on project selection and implementation.	Integrate urban, rural, and CVO into one coordinated plan for the state.	Focused primarily on urban applications of ITS, building on MnDOT's strengths in traffic management and traveler information.
4.	Time to Develop	14 months	unknown	18 months	unknown	unknown	~12 months
5.	Agency's Level of Effort (hours per month)	unknown	unknown	20 hrs/month	unknown	15 hrs/month	30 hrs/month
6.	Used Consultants? (y/n)	yes	yes	yes	unknown	yes	yes
7.	Consultant's Cost	unknown	$824,000	$370,000	unknown	$447,882 (incl. 2 year evaluation period)	$300,000
8.	ITS Functional Areas						
	ATMS			yes	yes	yes	yes
	ATIS		yes	yes	yes	yes	yes
	APTS			yes			
	CVO		yes	yes	yes	yes	
	EM		yes	yes		yes	
	AVCS						
9.	Other Strategic Plan Highlights	Long-term Evaluation Plan	Identify transportation and information needs and develop a strategic approach for implementing rural ITS strategies on a larger scale.	Regional architecture tied to geographic regions (county/agency), various technologies and communications infrastructure to support ITS projects, and mainstream into STIP process.	Develop approach to recommending projects to include business orientation, fiscal constraints, stakeholder buy-in, and support mainstreaming into STIP process.	Mainstream into business procedures, identify funding opportunities, and set priorities for ITS project areas.	Research, testing, and deployment of ITS on a statewide basis.
10.	Included a Statewide/Regional/Project ITS Architecture? (y/n)	yes	yes	yes	no	yes	no (Developed in 1995 in Polaris Project)
	Used Turbo Architecture software		unknown	X		unknown	
	Developed User Service Plan	X	unknown	X		unknown	
	Identified/Customized Market Packages	X	unknown	X		unknown	
	Logical Architecture (functions diagram)		unknown			unknown	
	Identified Equipment Packages		unknown			unknown	
	Defined Subsystems/Subsystem Connectivity		X	X		X	
	Prepared Sausage Diagrams		unknown	X		X	
	Prepared Data Flow Diagrams	X	unknown	X		unknown	
	Identified Key Standards		unknown	X		unknown	
11.	Identified Potential Funding Sources	no	yes	yes	no	yes	yes
	Potential funding sources discussed		US DOT Research and Special Programs Administration, Caltrans, ODOT	RTIP, STIP, CMAQ. County-based "ITS Fund". Within Caltrans District 5 - ITS Program Budget and State Highway Operations Protection Program (SHOPP).		KDOT (ITS set-aside funds), Federal and State Research Funds.	MnDOT, counties, cities, and congressional earmarks.
12.	Considered Operations, Maintenance & Mgmt. Activities	unknown	yes	unknown	unknown	unknown	unknown
13.	Identified Costs and Benefits	no	no	yes - based on FHWA's ITS Benefits Update (September, 1999).	unknown	Potential benefits identified.	unknown
14.	Current Status	Plan complete. Currently in deployment and operation stages of fax projects. Plans for other implementations "moving forward".	Plan Complete	Completed June 2000	In initial stages of being refined. Refined plan scheduled for completion in October 2002.	Completed March 2000	Completed in 1992
15.	Miscellaneous Notes 1. Status as of January 2001 2. For further information, please refer to each Case Study (Appendix A)			ITS Coordinating established to update ITS Strategic plan and assist in ITS implementation.			Minnesota Guidestar represents a series of plans reflecting research, testing, and deployment of ITS on a statewide basis. The original plan was completed in 1992 with subsequent plans/products in 94', 95', 97', and 00'. Data presented herein describes the original 1992 effort unless otherwise noted.

	ITEM	Montana	Nebraska	New Mexico	New York	Oregon	Washington
1.	Plan Title	Montana Statewide ITS Strategic Plan	Nebraska ITS Statewide Strategic Plan	New Mexico ITS Strategic Plan	NY MOVES	Rural ITS Strategic Plan	VENTURE Washington
2.	Project Start and End Dates	1997 - 1999	1997 - 1998	May 2000 - Nov 2000	Jan 1998 - Jun 1999	Oct-98	1992 - 1993
3.	Strategic Focus Areas	Primarily focused on developing projects, program integration, educational and outreach, funding and deployment. Emphasis on developing process.	The main goal of the plan was to provide overall direction to ITS efforts in the state.	Develop recommendations for ITS projects for short-, mid-, and long-term implementation	Developed to advance ITS implementation in the upstate and downstate regions of New York, in both rural and urban areas.	Identify the specific needs of the state, develop a coordinated program and framework for deploying suitable ITS technologies, and identify policies and legal parameters for successful ITS deployment.	Develop a strategic vision for deployment of ITS technologies throughout the state.
4.	Time to Develop		14 months	18 months	16 months	~12 months	~12 months
5.	Agency's Level of Effort (hours per month)	25-50 hrs/month	100 - 120 hrs/month	100 - 120 hrs/month	unknown	ODOT project manager - 56 hrs/month, support staff - 40 hrs/month	80 hrs/month
6.	Used Consultants? (y/n)	yes	yes	yes	yes	yes	yes
7.	Consultant's Cost	$200,000	$60,000	$130,000	$405,000	$150,000	$500,000
8.	ITS Functional Areas						
	ATMS	yes		yes			
	ATIS	yes		yes			
	APTS	yes					
	CVO	yes					
	EM	yes		yes			
	AVCS						
9.	Other Strategic Highlights	Identified candidate applications (e.g., HAR, kiosks, DMS, etc.) for near-term implementation.	FHWA 7 Critical Program Areas (CPAs). Also addressed an 8th CPA created by the State that focuses on communications.	Public-private partnerships, road maintenance operations, communications infrastructure and state agency connectivity.	FHWA 7 Critical Program Areas (CPAs)	ITS Market Packages and applications associated with these Market Packages were selected to address goals developed for ITS in the state.	Applications (e.g., ramp metering, etc.)
10.	Included a Statewide/Regional/Project ITS Architecture? (y/n)	yes	yes*	yes	no*	no	no*
	Used Turbo Architecture software	unknown		unknown			
	Developed User Service Plan	unknown					
	Identified/Customized Market Packages	unknown		X		X	
	Logical Architecture (functions/diagram)	unknown		X			
	Identified Equipment Packages	unknown					
	Defined Subsystems/Subsystem Connectivity	no		X			
	Prepared Sausage Diagrams	X (modified)		X			
	Prepared Data Flow Diagrams	unknown					
	Identified Key Standards	unknown					
11.	Identified Potential Funding	no*	yes	unknown	no	no	yes
	Potential Funding Sources Discussed		Federal, state, local, and non-traditional funding sources (public/private partnerships) are listed in the plan.				Federal, state, and private funding sources are listed.
12.	Considered Operations, Maintenance & Mgmt Activities	yes	yes	yes	unknown	yes	yes
13.	Identified Costs and Benefits	no	yes. Estimated benefits for each project in plan were developed. Benefits included: reduction in incident duration and frequency; traveler delay due to incidents or work zone activity, improved efficiencies in transportation operations, increased revenue from increased tourist traffic.	no	no	unknown	yes. Cost-benefit ratio developed for applications.
14.	Current Status	Completed in 1999.	Completed in 1998	Complete	Completed in 1999	Completed in 1998	Completed in 1995
15.	Miscellaneous Notes 1. Status as of January 2001 2. For further information, please refer to each Case Study (Appendix A)	Plan details funding capabilities of TEA-21 and the potential for local and private funding (specific agencies or organizations not listed.	Statewide architecture in plan was not developed directly from the National ITS Architecture.		Development of a statewide ITS architecture consistent with the National ITS Architecture proposed as a follow-on to the plan		Plan pre-dates development of the National ITS Architecture.

	ITEM	Alaska	Arkansas	CA: Tahoe Gateway	Iowa	Maryland	Wyoming
1.	Plan Title	Alaska Statewide Deployment Strategy	Arkansas Statewide ITS Strategic Plan	Tahoe Gateway Counties ITS Strategic Deployment Plan (CA)	Iowa DOT Integrated ITS and Services Deployment Plan	CHART II Business Plan	Statewide ITS Strategic Plan
2.	Project Start and End Dates			Feb 2000 - June 2002	1999 - 2000		Spring 2000 - Sept 2001
3.	Strategic Focus Areas			Develop an ITS deployment plan for the Gateway Region that will improve safety, efficiency, traveler information, and accessibility while addressing the unique aspects of the region's rural environment (eg., rapidly changing weather, etc.)	Develop a plan for organized deployment of ITS and help integrate current and future Iowa ITS projects and neighboring states' projects.	Improve traffic and incident management and traveler information. Also to articulate the program's goal's and objectives to support SHA business plan for 2001 - 2006.	Improving safety and efficiency, mainstreaming, and infrastructure improvement.
4.	Time to Develop	15 months	1 year	~ 30 months	14 months	6 months	~ 18 months
5.	Agency's Level of Effort (hours per month)	80 hrs/month for all DOT&PF personnel	N/A	20 hrs/month	unknown	15 hrs/month	unknown
6.	Used Consultants? (y/n)	yes	yes	yes	yes	yes	yes
7.	Consultant's Cost	$270,000	$185,000	~$315,000	$300,000	$70,000	$275,000
8.	ITS Functional Areas						
	ATMS	yes	yes		yes		
	ATIS	yes	yes	yes	yes	yes	yes
	APTS			yes	yes		
	CVO	yes	yes		yes		
	EM	yes	yes		yes	yes	
	AVCS	yes					
9.	Other Strategic Highlights	- Traveler communications and - Internal operations		Road Weather Information Systems (RWIS) and roadway safety aspects.	Coordinating ITS activities in several small cities around Iowa.	System integration and Communication.	RWIS
10.	Included a Statewide/Regional/Project ITS Architecture? (y/n)	yes	yes (planned)	yes. Regional (planned)	yes	yes	yes (in progress)
	Used Turbo Architecture software	unknown	unknown	planned Feb 2002	unknown	unknown	unknown
	Developed User Service Plan	X	unknown	X	X	unknown	unknown
	Identified/Customized Market Packages	unknown	unknown	planned Sep 2001	X	unknown	unknown
	Logical Architecture (functions/diagrams)	unknown	no	unknown		unknown	unknown
	Identified Equipment Packages	unknown	unknown	unknown	X	unknown	unknown
	Defined Subsystems/Subsystem Connectivity	unknown	no	unknown	X	unknown	unknown
	Prepared Sausage Diagrams	unknown	unknown	unknown		unknown	unknown
	Prepared Data Flow Diagrams	unknown	unknown	unknown		unknown	unknown
	Identified Key Standards	unknown	unknown	unknown	X	unknown	unknown
11.	Identified Potential Funding	yes	yes	yes (planned effort)	yes	yes	yes (planned)
	Potential Funding Sources Discussed				Funding opportunities will primarily involve state DOT funding.	1) CMAQ 2) Interstate Discretionary Funds 3) Federal ITS Earmark	
12.	Considered Operations, Maintenance & Mgmt Activities	yes	yes	yes (planned effort)	yes	yes	yes (planned)
13.	Identified Costs and Benefits	yes	yes	no	yes. Benefits and costs were assessed by examining results in other areas with similar projects. Estimated costs included O&M, equipment, and implementation.	yes	yes (planned)
14.	Current Status	Near completion	Just Starting	Finalizing the User Service Plan (Feb 2001)	Plan was completed in April 2000. Awaiting final acceptance and approval from Iowa DOT.	It has been finalized	Phase I complete (data collection, outreach and education). Phase II underway.
15.	Miscellaneous Notes 1. Status as of January 2001 2. For further information, please refer to each Survey Form (Appendix B)		Will focus on physical architecture. No intent to create logical architecture.		Plan designed to address ITS in relation to the following five areas: Safety, Preservation, Efficiency, Economic Development, and Balance. Balance included location (rural vs. urban), expansion (vs. preservation), quality of life (vs. economic development), modes, and cost-benefit.	Detailed architecture for the state using the National Architecture framework is ongoing. The current CHART II architecture is based upon requirements driven technology that allows for an open architecture and modular applications.	

	ITEM	CA: Sierra-Nevada	CA: Tahoe Basin	Michigan	Missouri	Nevada I-80/US95	South Dakota
1.	Plan Title	Statewide and Rural ITS Strategic Plan - Sierra Nevada	Tahoe Basin ITS Strategic Plan (CA&NV)	Michigan ITS Strategic Plan	Statewide Integrated ITS Business and Deployment Plan	ITS Strategic Plan for the I-80/US 395 Corridors	Rural ITS Deployment Plan
2.	Project Start and End Dates	Spring 2000 - Jun 2002	Jan 2000 - Dec 2001		Nov 2000 - Nov 2001	Jul- 2000 - Jul 2001	Feb 2000- Jan 2001
3.	Strategic Focus Areas	Determine whether ITS has potential in the Sierra Nevada by bringing transportation planners, builders, operators, and maintenance staff	Coordination of Tahoe Basin ITS activities with those of neighboring regions/corridors	Develop statewide vision for ITS deployment and strategy for deploying ITS throughout the state over the next 15 years	Develop a statewide ITS program that integrates various systems, provides consistency, and eliminates redundant system development.	Increasing safety and efficiency, supporting tourism, ITS development coordination, and outreach	Rural implementations - describe current ITS environment, strategic direction, propose coordinated program to address user needs, define organizational and management frameworks, and develop outreach/ educational materials
4.	Time to Develop	~ 24 months	~ 18 months	12 months (Initial 1996 Plan)	Estimate 12 months	12 months	11 months
5.	Agency's Level of Effort (hours per month)	80 hrs/month	24 hrs/month	unknown	unknown	20 - 30 hrs/month	~ 80 hrs/month
6.	Used Consultants? (yes)	yes	yes	yes (initial 1996 Plan)	yes	yes	yes
7.	Consultants Cost	$500,000	~ $330,000	~ $90,000 (Initial 1996 Plan)	$575,000	~$250,000	~$115,000
8.	ITS Functional Areas	unknown					
	ATMS	unknown	yes		yes		
	ATIS	unknown	yes		yes		
	APTS	unknown	yes				
	CVO	unknown			yes		
	EM	unknown	yes		yes		
	AVCS	unknown					
9.	Other Strategic Highlights	ITS to rural, mountainous areas	Improve roadway maintenance activities (especially during winter), and inter-agency coordination and management activities, and mainstream ITS into STIP process.	19 strawman action plans. Five areas highlighted: International border crossings, providing traffic information to ISPs, enhancing tourism, becoming Early Model Deployment area, integration of ATMS's and ATIS's.	Coordinate programs, mainstreaming ITS into MoDOT business process, and create a strategic vision for ITS in the state	Rural traveler information, information specifically for maintenance operators, ITS integration for corridor initiatives and Reno Metro Area ITS activities	Addresses rural safety initiatives that focus on roadway crashes (due to long emergency response times) and rural transit options
10.	Included a Statewide/Regional/Project ITS Architecture? (yes)	yes	yes	no	yes	yes	no
	Used Turbo Architecture software	unknown	X	unknown	unknown	X	
	Developed User Service Plan	planned	X	unknown	unknown	X	
	Identified Customized Market Packages	unknown	X	unknown	unknown	X	
	Logical Architecture (functions diagram)	unknown		unknown	unknown	X	
	Identified Equipment Packages	unknown		unknown	unknown	X	
	Defined Subsystems/Subsystem Connectivity	unknown	X	unknown	unknown	X	
	Prepared Sausage Diagrams	unknown	X	unknown	unknown	X	
	Prepared Data Flow Diagrams	unknown	X	unknown	unknown	X	
	Identified Key Standards	unknown	X	unknown	unknown		
11.	Identified Potential Funding	yes (planned effort)	yes (planned effort)	yes	yes	no	yes
	Potential Funding Sources Discussed			USDOT/FHWA, state transportation funds, US Army Tank-Automotive Command, major automobile manufacturers	Conventional highway funds, CMAQ, safety funds, state DOT operating funds, private-public, ITS earmarks		State transportation funds, FHWA (e.g., ITS, 511, Mayday, etc), city contributions, public-private partnerships.
12.	Considered Operations, Maintenance & Mgmt. Activities	yes (planned effort)	yes	no	yes	yes (planned)	yes
13.	Identified Costs and Benefits	The level of detail and degree analysis is unknown at this time (winter 2001).	yes (planned effort)	yes	Included in project scope - still in progress	yes (planned, benefits to be measured by needs addressed, meets study goals and objectives, deployment roads)	yes (extrapolated from projects in other states)
14.	Current Status	In progress, with June 2002 completion date scheduled.	In progress. Developing Market Package Plan (Feb 2001), completed "existing" regional architecture in Turbo, identifying ITS project "Early Winners" (Mar 2001).	Schedule has not been set at this time.	Planning process in early stages. Initial outreach efforts planned for march 2001.	Ongoing. Strategic plan under development. ITS Architecture complete and under review. Key technologies and short term deployment opportunities under review or being selected.	South Dakota DOT currently reviewing the plan to determine/ recommend projects for implementation.
15.	Miscellaneous Notes 1. Status as of January 2001 2. For further information, please refer to each Survey Form (Appendix B)						

ITEM	Idaho	Illinois	Tennessee	Vermont	Virginia	Wisconsin
1. Plan Title	Intelligent Transportation System Strategic Plan	Statewide and Rural ITS Strategic Plan	Tennessee DOT ITS Strategic Plan	Vermont ITS Strategic Plan	Rural Travel Demand Plan	Southeast Wisconsin Architecture and Traffic Management System Deployment Support
2. Project Start and End Dates	Jan 2004 - Dec 2005		Jan. 2005 - May 2006			June 2001 - May 2002
3. Strategic Focus Areas	Identify specific ITS projects, planning approach, and funding mechanisms.	Report on Illinois DOT statewide Strategic goals and how they relate to ITS technology applications.	Develop guidance on implementing ITS programs and provide a vision TDOT will improve transportation in Tennessee.	Review Rural ITS components in VTrans, gather real-time mobility and assess ITS applications for Vermont.		Southeast Wisconsin Regional Planning Commission (SEWRPC) is the Metropolitan Planning Organization (MPO) for the Milwaukee urbanized area. The Commission is responsible for preparing and maintaining a comprehensive plan for the physical development of the seven-county Southeastern Wisconsin Region.
4. Time to Develop	2 years	18 months (planned)	12 months	12 months	24 years	18 months
5. Agency's Level of Effort (person-years used)	unknown, 1.0 FTE - $95,000 state funds		36 hrs/month	1.5 man-months	no info	125 hrs/month
6. Used Consultants? (y/n)	yes		yes	yes	yes	yes
7. Consultant's Cost	~$500,000		~$150,000	$45,000	no info	($60,000 (previous preliminary engineering for high priority ITS Projects).
8. ITS Functional Areas						
ATMS II					X	X
ATIS					X	X
ATMS						X
CVO						X
EM			X	X		X
APTS					X	
9. Other Strategic Highlights	Identified needs, strategies, projects, programming, regional and statewide architectures.		Identified TDOT needs for User Services to determine applicability of various systems.	Small ITS		Project study area has recently been extended south into Illinois to include the Lake Geneva Area.
10. Included a Statewide/Regional Project ITS Architecture? (y/n)	yes	underway	yes	yes (draft)	yes	yes
Used Turbo Architecture software					unknown	X
Developed User Service Plan			X	X	X	X
Identified Institutional Issues	X		X		unknown	X
Technologies						
Regional Architecture (Communications)					unknown	
Identified Deployment Strategies					unknown	
Defined Interconnectivity Strategies	X		X		unknown	X
Connectivity						
Proposed Image Dispatch	X				unknown	X
Proposed Data Fiber Dispatch	X		X		unknown	X
Identified Key Corridors				X	unknown	X
11. Identified Potential Funding	yes		no	yes	no	X
Potential Funding Sources Discussed	Interstate maintenance, NHS, STP, TEA-21 HPTD, CMAQ, FTA were both discussed. by ITD, state funds programmed					Wisdot budget, HSIP, STP, FTA, Federal earmarks, and Wisdot capital budget process.
12. Considered Operations, Maintenance & Impact Analysis	yes		yes	no	yes	yes
13. Identified Costs and Benefits	yes (costs only)		yes (qualitative, undeveloped. Procedure/process in other words)	yes	no	yes
14. Current Status	Completed December 2005		Completed ITS Strategy overview (software, plan, update)	1998 complete.	2001 update almost complete	Completed in Milwaukee (metro) 1 hours). Architecture Maintenance Ann Arbor, 2001. Preliminary Engineering Announced on Jan 2002.
15. Miscellaneous Notes 1. Status as of January 2007. 2. For further information, please refer to each Survey Form (Appendix B)		ITS Architecture update/planning 2001.				