U.S. Department
of Transportation
**Federal Highway
Administration**
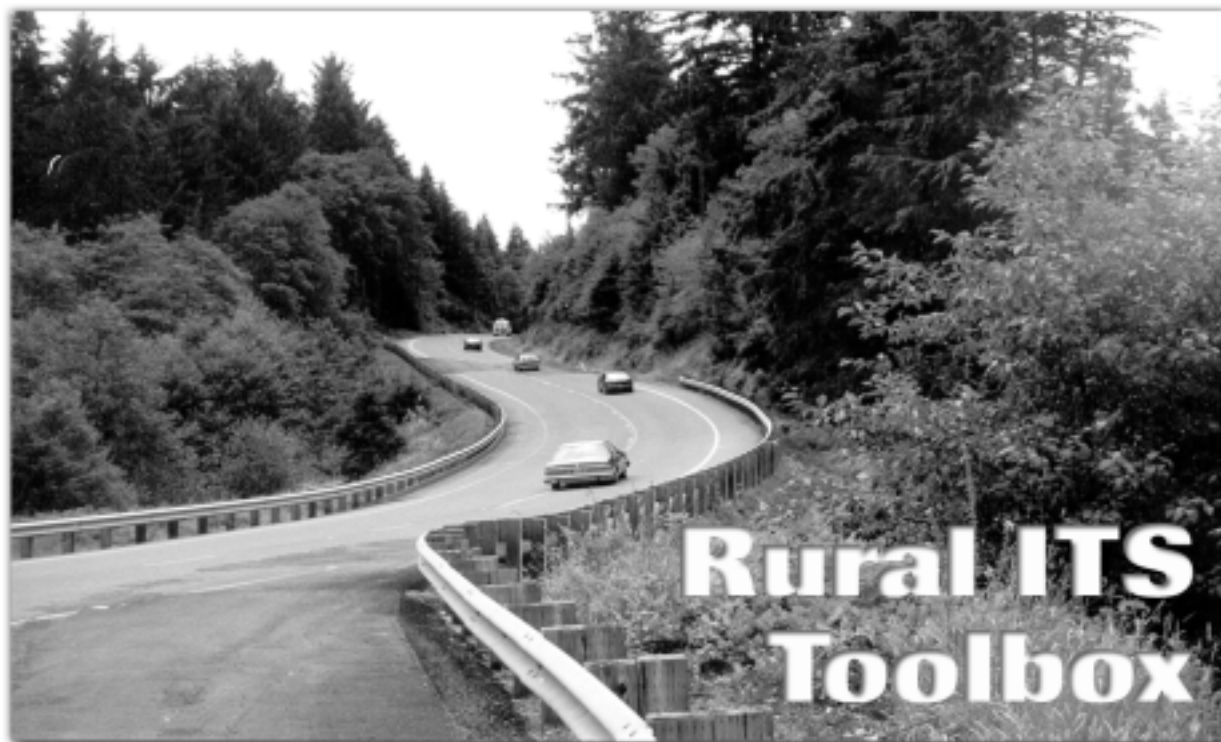
NHI Course #137007

# Rural ITS Toolbox

Instructor's Guide



**NHi**
**NATIONAL HIGHWAY INSTITUTE**
*Training Solutions for Transportation Excellence*

# Table of Contents

## I.    INTRODUCTION

It has recently become increasingly common for states and regions across the country to consider the potential of planning, developing, and deploying Intelligent Transportation Systems (ITS) solutions for their rural and small urban areas.  Some of the most progressive states have also examined these opportunities from a statewide perspective.  However, while there is a body of experience developing in this area, it has not been shared effectively with all potential users.  As such, each group that embarks on efforts such as these typically has to start from scratch and has to develop their own techniques for successfully deploying an ITS initiative.

In order to address this issue, the United States Department of Transportation (USDOT) has invested in the development of documents such as the *Rural ITS Toolbox*.  While the toolbox is extremely valuable, the unfortunate truth about paper reports is that when the practitioners receive them, they are all too often put on a shelf and forgotten.  In addition, practitioners sometimes use the excuse that they won't use the resource unless instructed by their managers or directors.

Therefore, the National Highway Institute (NHI) is initiating the development of a program to update and deliver the training course, Rural ITS Toolbox.  By presenting the material in the form of a one-day training course, it is hoped that the practitioners will become familiar with the toolbox and learn how to apply it.  In addition, since the course is only one day, managers and directors can attend it, so that they can learn the value of the Toolbox and encourage its use within their operations.

The Rural ITS Toolbox Training Course will discuss successful Rural ITS Projects and Statewide ITS planning initiatives from across the nation.  It will guide participants through proven processes and initiatives for the successful deployment of Rural ITS.  The Training Course will investigate the transferability of Rural and Statewide ITS initiatives to other locations and will describe some "lessons learned" during the deployment process.

## II.    COURSE ORGANIZATION

This one day course will be presented by qualified instructors using the curriculum materials, Rural ITS Toolbox, a Participant's Workbook and various visual aids, such as computer-generated slides, overhead transparencies, easels and similar tools.

All Participants will be provided with copies of the Rural ITS Toolbox and the Participant's Workbook for this course.

The Rural ITS Toolbox identifies successful rural ITS projects and statewide applications from across the nation.  ITS Tools referenced in the document are categorized on the basis of the seven Rural ITS Development Tracks defined in the FHWA document "Rural ITS User Needs".  The seven tracks are:  emergency services, tourism and travel information, traffic management, rural transit and mobility, crash prevention and security, operation and maintenance, and surface transportation and weather.  Information designed to help planners evaluate the appropriateness of a given ITS application is provided for each tool.  This information includes:  needs addressed

by the tool, a concise description of the tool, deployment examples, lessons learned from each deployment, benefits, implementation issues, institutional issues encountered, references, and other potential uses for the tool.  To assist users, tools may be referenced by one of three methods:  based on one of the seven tracks (e.g., emergency services), by location of implementation (e.g., state), or by the need addressed (e.g., work zone safety).  ITS Toolbox is intended to support agencies and groups that are beginning the process of rural or statewide ITS deployment by making the body of experience associated with various ITS application deployments accessible to potential new users.

A hard copy of the slides used in the presentation, class exercises, example problems and other materials to be used in the course will be included in the Participant's Workbook.

A detailed preliminary agenda has been prepared.  This agenda will be revised prior to the teaching of the course in various regions.

This course is typically designed to run from 8:00 a.m. to 4:00 p.m.  Other time frames can be accommodated, provided notice is given at the time of the course request.  However, sessions and learning objectives may also require modification.  A sample agenda is shown in Section X.

### List of Sessions

| Session Number | Description and Text Reference | Time (Minutes) |
|:---:|:---|:---:|
| 1 | Introduction | 30 |
| 2 | Rural Challenges and Transportation Technology | 60 |
| 3 | Planning for Success | 75 |
| 4 | Rural ITS Tools | 150 |
| 5 | Information Resources and Course Summary | 60 |

Total Time:          6:15

## III.    COURSE COORDINATION

Communication for scheduling and arranging the course will be through the NHI Training Officer, the Contractor for this course, FHWA Course Instructors and the local DOT Training Coordinator.  A DOT Training Coordinator contacting the NHI Training Coordinator, who, in turn, contacts the Course Contractor, usually initiates the process.  The Contractor contacts the DOT Training Coordinator and discusses possible dates for the course.  Then, the Contractor checks availability of Instructors, starting with FHWA Instructors, for the possible dates.  The delivery date for the course is confirmed to the State Coordinator, and to the NHI Training Coordinator and Instructors, by the Contractor, after Instructor availability has been confirmed.

The DOT Coordinator submits a formal course request to the NHI, and it is forwarded to the Contractor, and authorizes the Contractor to teach the course.  The Contractor communicates with the DOT Coordinator to:  confirm times of instruction; obtain directions to training facility; detail Host State requirements (see Section V; Host State Responsibilities); identify the State Speaker; and obtain lodging recommendations for the Instructors.

The NHI will ship 30 copies each of the Rural ITS Toolbox and the Participant's Workbook to the local DOT Training Coordinator at the address shown on the Course Request Form (1530). **It is highly recommended that the local DOT Training Coordinator distribute these documents to the Participants at least one week in advance of the course and that the Participants be encouraged by local DOT Training Coordinator to scan through the documents prior to coming to the class (and be allowed on-the-job time to review course documents).**  In the event that these documents cannot be distributed prior to the course, a copy of each Toolbox should be placed at each Participant's seat by they local DOT Training Coordinator prior to the beginning of the class.  Also name tents, a writing pad for performing class exercises and a pen or pencil should be provided for each Participant.  NHI will also provide a registration form, name tents, course evaluation form and course certificates.  The course coordinator must notify the NHI Training Officer concerning any changes to the number of documents or to the shipping address.

Handout materials supplied by the Contractor are mailed to the DOT Coordinator approximately two weeks prior to the course, or hand-carried by an Instructor.  Handouts include agenda, participant questionnaire, and any additional worksheets.

The Contractor transmits (usually by facsimile) to the NHI Training Coordinator the Class Registration Form within five days after the course.  The original Class Registration Form, course evaluation, and CEU applications are mailed to the NHI Training Coordinator.  A Thank You note to the DOT Coordinator is usually sent by the Contractor.  Copies of the evaluation forms are sent to the DOT Coordinator by the NHI Training Coordinator.


## IV.    CLASS SIZE

The maximum class size permitted by the NHI is 30 people to achieve the learning objectives for this course.

## V.     HOST AGENCY RESPONSIBILITIES

**Audio/Visual Equipment Requirements**

Visual aid information will be delivered through PowerPoint Visuals, overhead transparencies, flip chart, and a whiteboard/chalkboard.  The following equipment is needed for presenting the visual aids:

- A personal computer with a current version of Microsoft PowerPoint installed;
- High resolution multimedia projector and interface cables for the computer;
- Very large (8-foot width minimum), high quality projection screen;
- An electronic pointing devise (laser-type preferred);
- Two extension cords (one at least 20 feet long and one at least 10 feet long);
- One power strip with a minimum of four (4) grounded outlets;
- A flip chart with large, colored marking pens;
- One whiteboard/chalkboard with markers/chalk and an eraser, or a second flip chart with markers;
- Several (six) large, black marking pens for participants identification placards;
- Additional visual aids, as required for the Host State presentation; and
- Spare batteries for laser pointer, remote controls.

The equipment should be placed in the room and available to be checked the Instructors at least one-hour prior to the beginning of the course.  The Host State should provide technical assistance during this checking period, and contact information for technical assistance, if needed during the course.

**Room Requirements**

The classroom should be a large conference room or a similar room with a flat, level floor, adequate ceiling height to permit visual aids to be clearly seen from the back of the room and with sufficient tables and chairs for about 30 Participants and two Instructors.  The tables and chairs should be arranged in the classroom style and laid out in cluster formations to allow teams of four to six individuals to work together in each clustered area.  Tables should be separated to permit Instructor access to the participants, as a high-level of interaction will be used to convey the learning objectives.  All participant desks or tables should be oriented so that participants face the front of the room; however, participants can move to other positions for team exercises (e.g., opposite side of a table).  A table with two chairs should be located at the back of the room as a preparation area for the Instructors.  A presentation table should be placed at the front of the room.  A table or cart with the personal computer, multimedia projector, any other projection equipment required for the host state presentation and the screen should be aligned with the center aisle.  The room should be in a quiet area and if available should have a lighting system that permits convenient dimming of the lights, especially at the front of the room, by the Instructors.  Rooms with windows should include working blinds to allow for reduction of light as needed.

# VI.   TARGET AUDIENCE

The primary target audience for this course is transportation professionals involved in the planning and implementation of solutions to transportation needs in rural areas.  The course will benefit practitioners familiar with ITS as well as those whose area of expertise or responsibility is not strictly confined to ITS.  This course will also benefit staff likely to be involved in ITS planning as key stakeholders on coordination committees or task forces.  The primary target audience for this course includes representatives from the following agencies or organizations:

- Transportation Agencies
    - Federal, State, and Local
    - Executives, Engineers, and Planners
- Public Mobility Service Providers
- Public Safety Responders (enforcement, fire, EMS, etc.)
- National Parks and Forest Services
- Other Interested Parties
    - IT Personnel
    - Tourism & Chambers of Commerce
    - Colleges and Universities
    - Consultants and Contractors

# VII.   COURSE GOAL AND OBJECTIVES

## Course Goal

The goal of this course is to introduce the participants to the Rural ITS Toolbox and to familiarize the participants with ITS strategic planning.  At the end of the course, the participants should be able to describe the contents of the Rural ITS Toolbox, the benefits of representative tools, and a general understanding of the ITS Strategic Planning process necessary to engage relevant stakeholders in the development of Rural ITS.

## Course Objective

1. Define transportation needs and challenges in rural environment
2. Define ITS and advanced rural transportation systems (ARTS)
3. Relate the value of rural ITS Toolbox
4. Describe ITS strategic planning
5. Explain the benefits of ITS applications in rural areas
6. Relate lessons learned in rural ITS implementations
7. Identify information resources

## VIII.  EXECUTIVE SUMMARY

The executive summary of the course will be utilized by the FHWA Resource Centers and others for presentations to executives, high-level managers, universities, etc. in the public and private sectors.  The executive summary is designed to be delivered between one and two hours.

The executive summary is available as two separate NHI publications: a presenter guide with speaking notes (Publication No. FHWA-NHI-03-063), and a handout set to be given to the executive summary attendees (Publication No. FHWA-NHI-03-064).   In addition, a CD with a PowerPoint version of the executive summary is available for use by the presenter (Publication No. FHWA-NHI-03-065).

## IX.    FINAL SESSION PLANS

The final lesson plans presented below are designed to create an environment that allows course participants to achieve learning objectives set forth for each session.  Session design emphasizes acquisition of knowledge through an interactive approach that includes participant-participant interaction as well as instructor-participant interaction.  Instructors will evaluate participants' attainment of session learning objectives through question and answer periods, discussion, and participant exercises.

| Title | Session 1: Introduction and Course Objectives |
|---|---|
| **Performance-Based Learning Objective** | Participants will introduce themselves and summarize their backgrounds |
| **Instructional Method** | Instructors and participants provide self-introductions – instructors should introduce themselves first to provide participants with an example of the content of the information to be provided as well as a general guideline for the amount of time each self-introduction should take. Participants will be asked to provide brief statements on their experience with ITS. This will help instructors tailor the level of detail that each Rural ITS Tool should be discussed.

Instructors will encourage participants to actively participate in the course.  Instructors will describe the various activities that will be used to achieve course learning objectives (e.g., scenario role play).

Instructors will state course rules for attendance, breaks, and other pertinent administrative information.

Instructors will provide a description of course learning objectives. Instructors will summarize the content of the Rural ITS Toolbox in the course of describing learning objectives.

Instructors will discuss course evaluation forms and emphasize the importance of these forms. |
| **Time Allocation** | Presentation 30 minutes                    **Total:** 30 minutes |
| **Evaluation Plan** | NA |
| **Reference** | NA |

| Title | Session 2: Rural Challenges and Transportation Technology |
|---|---|
| **Performance-Based Learning Objective** | Participants will:<br>• recognize transportation needs, challenges (technical and institutional), and opportunities typically associated with the rural environment<br>• identify ITS elements, functions, and technologies typically applied in the rural environment |
| **Instructional Method** | Instructors will present transportation needs, challenges, and opportunities identified by rural transportation stakeholders during previous FHWA projects (e.g., results of Rural Needs Assessment). Instructors will discuss key aspects of it and why they are more typically associated with the rural environment.  Instructors' presentation format will be based on Advanced Rural Transportation Systems (ARTS) Development Tracks.<br><br>Instructors will ask participants to identify local transportation needs, challenges, and opportunities with which they are familiar.  Participants will be encouraged to discuss these and "determine" if they are rural. Instructors will use this discussion to reinforce participants' ability to recognize needs, challenges (technical and institutional), and opportunities typically associated with the rural environment.<br><br>Instructors will present ITS elements, functions, and technologies typically applied to address transportation needs, challenges, and opportunities typically associated with the rural environments. Instructors will briefly present ARTS Development Tracks. Instructors will emphasize that while not all transportation problems have an ITS solution, ITS can be an effective tool. Instructors will also relay the importance of interagency cooperation for ensuring success in applications of ITS technologies<br><br>Instructors will ask participants to identify any other ITS elements with which they may be familiar.  In the course of this activity instructors will reinforce participants' ability to identify ITS elements, functions, and technologies typically applied to address rural transportation needs, challenges, and opportunities. |
| **Time Allocation** | Presentation: 40 minutes<br>Participant Discussion: 20 minutes          **Total:** 60 Minutes |
| **Evaluation Plan** | Evaluate participants' response to instructors' questions. |
| **Reference** | Rural ITS Toolbox, Rural ITS User Needs Report for FHWA |

| Title | Session 3: Planning for Success |
|---|---|
| **Performance-Based Learning Objective** | Participants will: <br>• describe ITS Strategic Planning process <br>• describe the National ITS Architecture <br>• identify main or typical steps in ITS strategic planning process (critical planning elements) <br>• identify major activities associated with each critical planning element in ITS strategic planning process <br>• identify key stakeholders in ITS strategic planning process |
| **Instructional Method** | Instructors will describe why states/regions perform ITS strategic planning.  In the course of this discussion instructors will cite testimonials from staff involved in development of ITS Strategic planning as to advantages of this process.  Lessons learned from case studies of statewide or regional ITS planning efforts will also be presented.  Instructors will lead participants through various planning processes performed by various states/regions for ITS strategic plans. Instructors will describe the National ITS Architecture to include its purpose, main elements, and general approach to use (including Turbo Architecture software).  Descriptions of planning efforts will focus on plans that addressed rural areas. Implications of the final rule regarding the National ITS Architecture will also be briefly addressed. <br> Instructors will describe various activities and ask participants to ascribe these activities to steps in the ITS strategic planning process.  Instructors will ask participants to describe steps they felt most important and key stakeholders (emphasize for those with experience preparing ITS strategic plans).  Instructors will use this discussion period to reinforce participants' ability to identify advantages of performing ITS strategic planning and the major steps associated with it. <br> Instructors will guide participants through a series of problem solving activities designed to support learning objectives. Participants will be presented with a scenario that requires them to go through the ITS planning process to address a set of given needs.  Participants will use the Rural ITS Toolbox as a reference to develop lists of alternative solutions.  Benefits of various approaches will be presented to assist in alternative selection.  Participants will discuss their solutions at the end of the activity. |
| **Time Allocation** | Presentation: 55 minutes <br> Participants' Discussion/Activity: 20          **Total:** 75 Minutes |
| **Evaluation Plan** | Evaluate participants' ability to identify key steps in ITS strategic planning process, advantages of performing the process, activities associated with each step, and likely stakeholders |
| **Reference** | Statewide and Rural Deployment of ITS: "Lessons Learned". National ITS Architecture Guidance: Developing, Using, and Maintaining an ITS Architecture for your Region |

| Title | Session 4: Rural ITS Tools |
|---|---|
| **Performance-Based Learning Objective** | Participants will: <br>• recognize seven rural ITS development tracks <br>• use the Rural ITS Toolbox to identify ITS applications to address user needs identified in Session 2 <br>• recognize key stakeholders in the ITS deployment process <br>• recognize advantages of various ITS approaches based on lessons learned <br>• describe various benefits associated with application of ITS in rural areas <br>• identify typical measures of effectiveness for ITS in rural areas. |
| **Instructional Method** | Instructors will provide a description of each of the rural ITS development tracks. Each description will include the main user needs associated with each development track. Instructors will describe examples of ITS tools from Rural Toolbox document that address user needs associated with various tracks. Instructors will explain to participants how to reference Rural Toolbox document to find appropriate ITS tool (e.g., by ITS Development Track, by user need, or by geographic location). Instructors will describe key stakeholders typically involved in ITS deployment process. Instructors will present lessons learned (implementation and institutional issues) associated with various ITS approaches to user needs. <br>Instructors will ask participants to cite benefits of ITS applications with which they are familiar. Participants will be encouraged to discuss other possible measures of benefits (in addition to those described by instructors). Instructors will use this discussion to reinforce participants' ability to identify various benefits associated with application of ITS in rural areas; identify typical measures of effectiveness for ITS in rural areas. <br>Instructors will ask participants to recall local rural user needs identified in session 2 and discuss which development track the need would fall under. Instructors will use this discussion to reinforce participants' ability to identify the development tracks and associated user needs. Instructors will ask participants to find ITS applications in the Rural Toolbox document to address various user needs and development tracks. Instructors will use this activity to reinforce participants' ability to use the Rural ITS Toolbox to identify ITS applications to address various user needs. |
| **Time Allocation** | Presentation: 60 minutes                    **Total:** 150 Minutes <br>Participants' Discussion/Activity: 90 minutes (two learning exercises) |
| **Evaluation Plan** | Evaluate participants' response to instructors' questions/ability to find ITS applications in Rural Toolbox document. |
| **Reference** | Rural ITS Toolbox, Rural ITS User Needs Report for FHWA, ITS Benefits: Continuing Successes and Operational Test Results; ARTS Conference Proceedings. |

| Title | Session 5: Information Resources and Course Summary |
|---|---|
| **Performance-Based Learning Objective** | Participants will:<br>• identify resources available to assist in ITS planning and implementation |
| **Instructional Method** | Instructors will ask participants to discuss  key points presented during the course of the session.  Points to be addressed will include:<br><br>• Rural Challenges and User Needs<br>• ITS Applications – Rural ITS Toolbox<br>• ITS Benefits<br>• Lessons Learned<br><br>Instructors will also provide participants with a list of other resources to assist them in ITS planning and implementation.<br><br>Participants will be given the opportunity to ask questions regarding information presented in course. |
| **Time Allocation** | Presentation: 30 Minutes                         **Total:** 60 Minutes<br>Participant Questions: 30 Minutes |
| **Evaluation Plan** | NA |
| **Reference** | ITS Resource Guide 2001, state contacts (specific to training location) such as local ITS America Chapter POCs, and FHWA field POCs will be provided. |

## X.    COURSE AGENDA

# NHI Course #137007
# Rural Intelligent Transportation Systems (ITS) Toolbox

## Course Agenda

| Sponsoring Agency | |
|---|---|
| Location | |
| Date | |
| Instructors | |
| | |

| Time | | | Topic | Session |
|---|---|---|---|---|
| Duration | From | To | | |
| 0:15 | 08:00 AM - | 08:15 AM | Registration | |
| 0:30 | 08:15 AM - | 08:45 AM | Introduction and Course Objectives | 1 |
| 0:15 | 08:45 AM - | 09:00 AM | Break | - |
| 1:00 | 09:00 AM - | 10:00 AM | Rural Challenges and Transportation Technology | 2 |
| 0:15 | 10:00 AM - | 10:15 AM | Break | - |
| 1:15 | 10:15 AM - | 11:30 AM | Planning for Success | 3 |
| 1:00 | 11:30 AM - | 12:30 PM | Lunch Break | - |
| 1:00 | 12:30 PM - | 01:30 PM | Rural ITS Tools (presentation) | 4 |
| 0:15 | 01:30 PM - | 01:45 PM | Break | - |
| 1:30 | 01:45 PM - | 03:15 PM | Rural ITS Tools (exercises) | 4 |
| 0:15 | 03:15 PM - | 03:30 PM | Break | - |
| 1:00 | 03:30 PM - | 04:30 PM | Information Resources and Course Summary | 5 |

## XI.   COURSE OUTLINE

**Session 1     Introduction**
- Introductions (Instructors & Participants)
- Course Format
- Course Objective
- Course Evaluation

**Session 2     Rural Challenges and Transportation Technology**
- Learning Objectives
- Traveler Needs
  - Discussion of Local Needs
  - Summary of the Results of Rural Needs Assessment Initiatives
- Rural Challenges
  - Technical
  - Institutional
- ITS/ARTS Development Tracks

**Session 3     Planning for Success**
- Learning Objectives
- Critical Planning Elements
- National ITS Architecture
- Lessons Learned

**Session 4     Rural ITS Tools**
- Learning Objectives
- User Needs
- Stakeholders
- ITS Tool/Projects
  - Description
  - Lessons Learned
    - Implementation
    - Institutional issues

ITS Benefits in Rural Areas
- Learning Objectives
- Selected Benefits
  - Emergency Services
  - Tourism and Traveler Information
  - Traffic Management
  - Rural Transit and Mobility
  - Crash Prevention and Security
  - Operations and Maintenance
  - Surface Transportation and Weather

**Session 5        Information Resources and Course Summary**
- Learning Objectives
- Rural Challenges and User Needs
- ITS Applications – Rural ITS Toolbox
- ITS Benefits
- Lessons Learned
- Other Resources
    - Peer-to-Peer Program
    - FHWA ITS HelpLine

# Rural Intelligent Transportation Systems Toolbox
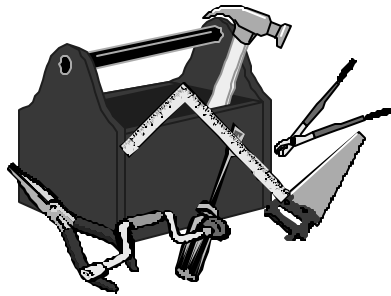
## A National Highway Institute Training Program

**Instructor's Notes:**

•A senior manager from the host agency may wish to introduce the class.  This helps acknowledge support for the course and material by upper management. The official should emphasize the value and utility of ITS technology for rural transportation needs.

•Instructors should welcome the participants and then introduce themselves by giving a brief statement of their qualifications, educational background, professional experience relevant to the subject matter of the training course, and any other information that would establish their credibility with the participants.

**Instructor's Script:**

Good morning!  Welcome to the Rural Intelligent Transportation Systems Toolbox course from the National Highway Institute!

# Course Goals

- Introduce the Rural ITS (Intelligent Transportation Systems) Toolbox
- Increase familiarity with ITS strategic planning

1-2

**Instructor's Notes:** The instructor will now preview the course goals. Give the participants a little background as to why this course has been developed, and why they are here.

**Instructor's Script:**

Due to a stated need by rural transportation agencies, the FHWA developed the Rural ITS Toolbox to aid in the deployment of ITS solutions in rural areas. While there is a body of experience in this arena, the information has not been effectively shared. A chief reason for the development of this document is to assist in making this body of experience more accessible to potential new users. This course will teach you how to use the Toolbox effectively by introducing the Rural ITS Toolbox, and by familiarizing you with the ITS strategic planning process.

# By the end of the day you will be able to:

- Identify rural transportation needs and challenges
- Define transportation technology
- State the value of Rural ITS Toolbox
- Describe key factors in ITS strategic planning
- Explain the benefits of rural transportation technology
- Relate lessons learned in rural transportation technology
- Identify additional information resources

1-3

**Instructor's Notes:** The instructor will introduce the learning objectives. These objectives are the keys to realizing the Course Goals, and need to be addressed and revisited throughout the course in order to be effective. The best way to use these objectives in this course is with the following sequence: 1) explain the facts; 2) practice; 3) get feedback and check for understanding. Instructor should bear this concept in mind when the objectives are revisited later on in each session.

**Instructor's Script:**

At the end of the day, we will demonstrate that we have met the course goals by being able to do the following:

•Identify the current rural transportation challenges and issues. We want to know your challenges, and then we will compare them to the User Needs that have been collected by the FHWA and were used to develop the Toolbox.

•Define transportation technology and describe how it can be used in rural areas. What makes up transportation technology? How is it used?

•Relate the value and utility of the Rural ITS Toolbox by demonstrating how it can be used.

•Describe ITS strategic planning. What is it? When is it necessary? What benefits does it provide?

•Explain the benefits of rural transportation technology. In what situations is it effective? What rural problems do not have transportation technology solutions?

•Relate some lessons learned from rural ITS deployments . This will be accomplished by citing project examples from around the country.

•Identify other information resources. This course is one of many that are available from NHI to learn more about ITS and strategic planning.

# Course Agenda/ Sessions

1.  Introduction (30 min)
2.  Rural Challenges and Transportation Technology (60 min)
3.  Planning for Success (60 min)
4.  Rural ITS Tools (150 min)
5.  Information Resources & Course Summary (60 min)

1-4

**Instructor's Script:**  The day long course will be divided into 5 learning sessions.  These sessions are:

**Session 1** introduces the participants and the instructor along with the course timeline and training site logistics (30 minutes).
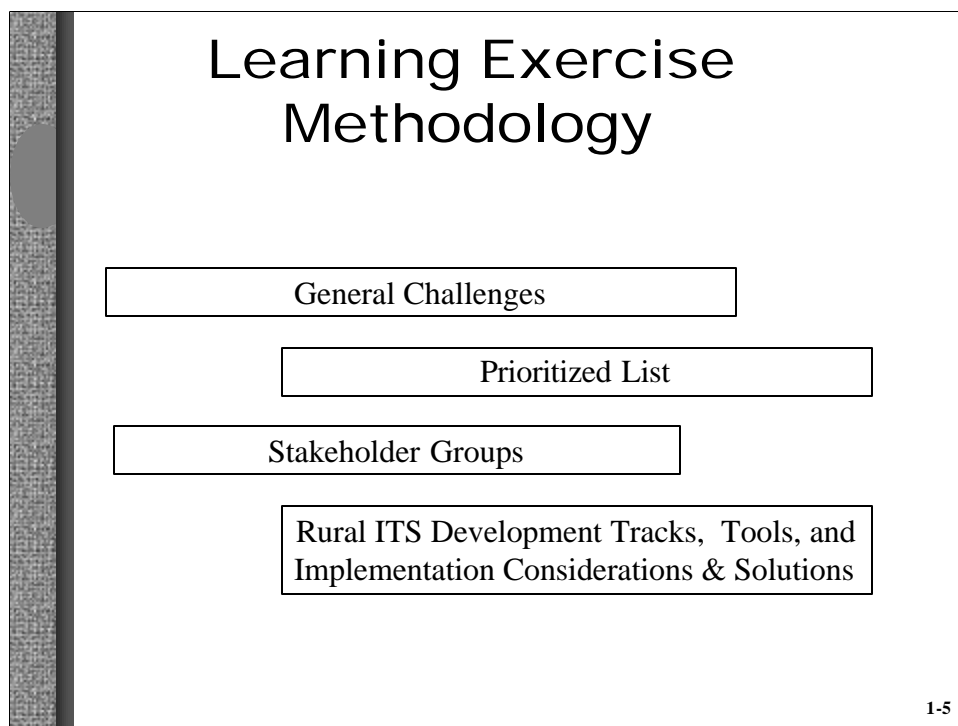
**Session 2** will investigate the needs and challenges that exist in rural areas and serve to introduce participants to rural ITS (60 minutes).  Following this session we will take a 15 minute break.  To keep on schedule, please be back in your seats at 10:00.

**Session 3** will give participants the key issues for planning for success. This session will emphasize the importance of stakeholder  outreach, strategic planning and regional architecture (60 minutes).  At 11:00 we will break for an hour lunch, please be back in your seats at noon.

**Session 4** will break out the technology and transportation tools through current project examples that address the identified needs and challenges as well as implementation considerations.  This session provides the  participant information on how to relate a given problem with an technology and transportation solution using the Rural ITS Toolbox (150 minutes).

**Session 5** will serve to review the course subject matter, emphasize reference materials and success stories, perform course and instructor eva luations, and to summarize the overall course goals (60 minutes).

# Learning Exercise Methodology

General Challenges

Prioritized List

Stakeholder Groups

Rural ITS Development Tracks, Tools, and Implementation Considerations & Solutions

1-5

**Instructor's Notes:** There is a learning exercise that the participants will be undertaking. The exercise is divided into separate parts and is undertaken during various sessions of the course. Each part of the exercise builds on the work undertaken by the participants in the earlier part of the exercise.

**Instructor's Script:** During the course of the day we will be dividing into groups and undertaking a learning exercise. The exercise is divided up between the various course sessions and each part of the exercise builds upon the work you did in an earlier part of he exercise.

# NHI Course Evaluation

- Course Content
- Instructional Material and Facilities
- Course Instructor(s)
- General Observations

1-6

**Instructor's Notes:**

In order to maintain the highest quality and to monitor content and usefulness evaluations will be conducted of the course and instructor. Evaluation forms to be pointed out to the participants at this time. These documents will either be located on a back table or somewhere in the participants' workbook. Instruct the participants to please take five minutes during the day to complete the evaluation forms.

# Training Site Logistics

- Location of facilities/smoking area
- Snacks/soda machines
- Turn off pagers and cell phones
- Message board

1-7

**Instructor's Notes:**

• Review training site logistics: explain the location of the restroom facilities, snack machines, smoking rules, and the message board.

• Request participants to turn off their pagers and cell phones.

• (If there isn't a message board skip this bullet) There should be a message board set up outside the classroom, give the participants the phone number.

# Self-Introductions

- **Name**
- **Agency**
- **What are your training objectives?**

1-8

**Instructor's Notes:**

• Instructor will call on the participants to introduce themselves.

• Self Introductions will follow the format demonstrated by the instructor.

• Participants should keep introductions to a minimum (15-30 seconds) in order to meet learning objectives and agenda…..politely interject if it becomes a problem.

• Emphasize that you want to know why the participants are here.

**Instructor's Script:**

Starting with _____ please introduce yourself; stating your name, agency, and what one thing do you want to get out of this course today?

**Instructor's Hints:**

*<Instructor will want to note a couple of individual's names and course interests, so that they may be used as an identification example later on. For example, if John Doe wants to learn more about how transportation technology can be used to address weather events….then he can be called to attention later on in Session 3. "Now John wants to know how we are using transportation technology to address weather, well here is how…." >*

## Session 2

### Rural Challenges and Transportation Technology

NHi
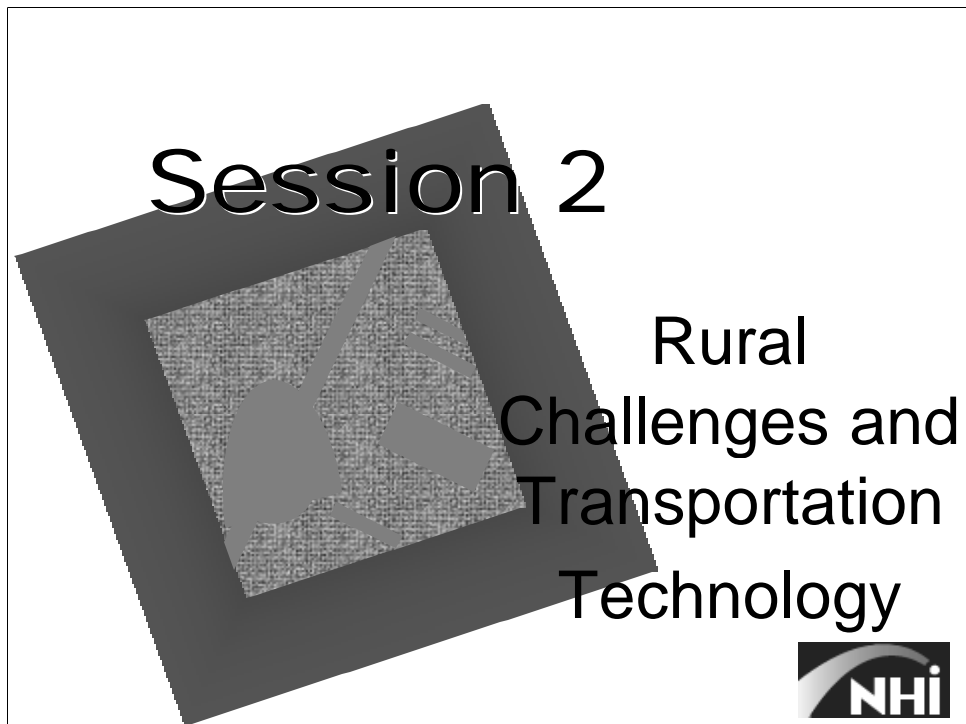
**Instructor's Script:**

Now we are going to talk about the challenges that exist on the rural transportation system, and how transportation technology has the potential to provide solutions.

# Learning Objectives

- Recognize transportation needs, challenges, and opportunities in rural environments
- Identify the seven rural ITS development tracks

2-2

**Instructor's Script:** These are the learning objectives for session 2. We hope that after today's course you will be able to share your knowledge with others in your agency. In this session, you will learn to:

•be able to identify and describe a wide range of needs and challenges that exist on the nation's rural transportation system, and be able to recognize where opportunities exist to develop solutions to these needs and challenges.

•You will also be able to identify the seven rural ITS development tracks around which the national rural ITS program has been structured. These seven development tracks are particularly important because they also form the structure of the "Rural ITS Toolbox," which the majority of this course is focused on.

# Exercise # 1

# What are your rural transportation needs and challenges?

2-3

**Instructor's Notes:** At this time, the instructor will present the participants with the task of identifying rural transportation challenges that they are familiar with. These will focus on issues that they deal with in their own jobs and that they experience in their geographic area.

**Goal:**

To develop a list of problems, needs and challenges related to the rural transportation system facing agencies in this area.

**Process:**

• Introduce the goal for the exercise. Divide the class into groups based on their seating locations (they do not need to move away from their current seats or tables). Then, pose the following: "**Let's take the next 10 minutes to develop a list of rural transportation problems faced by your agency or this region."** Instruct each group that they will need to appoint a leader to record their results on a flip chart at the front of the room.

• Move around the class and interact with the groups as they develop their lists. Keep the groups on track and try to avoid getting **too** involved with individual "war stories". The overall idea here is for the participants to interact and share needs.

• After 10 minutes, ask the groups to have their leader come up and write down their list on the flip charts.

• Remove the pages from the flip chart and tape on the walls. The participants will continue to use the taped pages in their next exercise so make sure the pages are taped up near their group.

• Briefly discuss the differences and similarities between the lists.

• Explain how some of the problems may or may not have transportation technology solutions, and that making this determination will be the focus of the next two sessions.

**Equipment:** Flip charts, markers, and tape.

**Time:** 20 minutes

# Rural Transportation in Context

- ____% of total roadway miles are rural (3,084,000 miles)
- ____% of vehicle miles traveled is in rural areas
- ____% of crash fatalities occur on rural highways (23,876 fatalities in 2000)
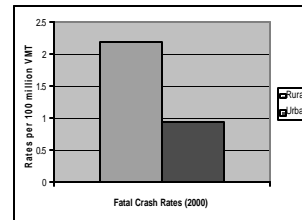
*Source: FHWA Highway Statistics 2000, Table HM-10, VM-2*

2-4

**Instructor's Notes:**  This slide provides a national context to the rural transportation system.  This is intended to show three things:  how large a part of the nation's transportation system is rural; contrasting the size the system with the amount of traffic it carries; and then contrasting the fact that it carries a minority of the traffic with the fact that the majority of fatal crashes occur on the rural system.  This will help get the participants focused on some of the key issues that will be discussed on subsequent slides.  This slide can be presented in an interactive manner**: Walk the participants through the three bullets on the slide asking them (see below) to fill in the blanks.**

**Instructor's Script:**

Let's start by thinking about the nation's transportation system as a whole, and talk about what rural transportation system looks like.

**Q1**: Now, what percentage of the nation's roadways would you say are rural?
**A1**: Well, it's almost 80 percent (78%) or about 3 million miles.

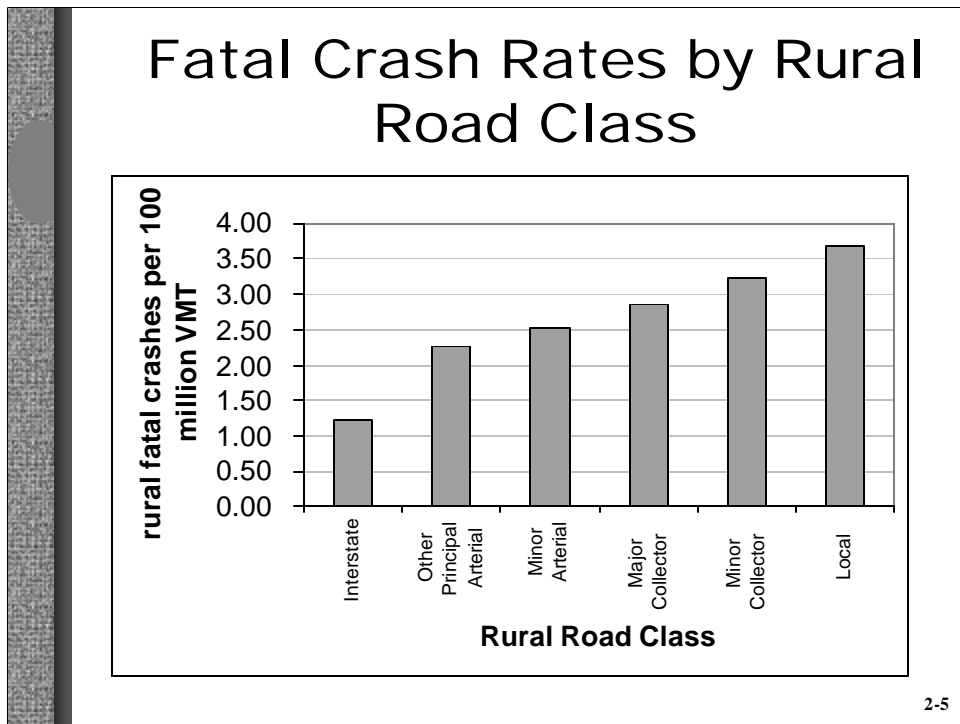**Q2**: What percentage of vehicle miles traveled would you say is in rural areas?
**A2**: Now we're down to about 40 percent (39%).

**Q3**: Now, what percentage of the nation's crash fatalities do you suspect occurs on rural highways?
**A3**: It's 60 percent.  That was almost 24,000 fatalities on rural roads in the year 2000.

So we can see that while rural roads carry less than half of the nation's traffic, they account for the majority of highway deaths.  Three out of five highway fatalities occur on rural roads, making these the least safe part of the nation's transportation system.

## Fatal Crash Rates by Rural Road Class

A bar chart showing rural fatal crashes per 100 million VMT by Rural Road Class:

| Rural Road Class | rural fatal crashes per 100 million VMT |
|---|---|
| Interstate | ~1.20 |
| Other Principal Arterial | ~2.25 |
| Minor Arterial | ~2.50 |
| Major Collector | ~2.85 |
| Minor Collector | ~3.20 |
| Local | ~3.65 |

2-5

**Instructor's Script:**

This slide further characterizes the rural roadway fatality problem, showing how it is distributed by roadway class. What this shows is that Interstate highways are the safest of the rural roadways, while local two lane roads tend to be the most dangerous.

# Understanding Rural Transportation

- Challenging topography, weather events, and road conditions
- Limited alternative routes
- High percentage of recreational  travelers and commercial vehicle operators

2-6

**Instructor's Notes:**  This slide introduces a set that highlight some the major challenges and problems that exist with the rural transportation system.  These slides are intended to show that there are some major themes that can be identified and which are generally consistent on much of the nation's rural transportation system.  This will demonstrate that the participants' needs are not necessarily unique, and so there has already been a lot of work that has gone into identifying potential solutions.  As you move through this set of slides, it is useful to make reference to needs and challenges that the participants identified in Exercise #1, where these are common with those presented on the slide.

**Instructor's Script:**

As all of you know, the rural transportation system presents situations and conditions that distinctly different and far more challenging than their urban counterparts.  Some of the major differences include:

•The nature of topography, weather events and road conditions can be far more challenging.  Not only do we have mountain passes that characterize much of the western United States, but also the open plains of parts of middle America, where drivers can become drowsy or easily distracted.  And, for example, severe winter storms or blizzards can easily, and sometimes unexpectedly, completely cut off large parts of the rural transportation system.

•Also, if a major crash occurs or there are construction activities that impact your travel, there are typically very few alternative routes that you can take.  This, of course, is in sharp contrast to the situation in most urban areas.

•Also, travelers in rural areas are seen to drive much longer distances,  and with a greater percentage of trips being for pleasure or recreational purposes.  This introduces many drivers to the rural system who are unfamiliar with the roads they are driving on or the conditions they might expect to encounter.

# A Concentration of Recreational Traffic

- Seasonal demand
- Route congestion
- High-frequency crash locations
- High parking demand and turn-over
- Limited transit options
- Limited infrastructure and funding

2-7

**Instructor's Script:**

There are many challenges associated with the concentration of recreational traffic in rural areas.  Much of this recreational  traffic is a seasonal in nature, creating congestion around National Parks in the summer or ski resorts in the winter, for example.  These increased traffic volumes can lead to a higher frequency of crashes associated with the congestion or because of drivers searching for the limited amounts of parking that typically exists.

The rural areas in which these recreational destinations are found typically have a strong economic dependence on these travelers and so are reluctant to employ solutions that will discourage travelers from visiting or stopping in their area.  Many of these locations are also severely limited in the amount of funding that can be used to implement solutions.  For example, there are very few transit systems in these locations, which could help reduce congestion or deal with the parking problems, or traveler information systems that would help make drivers more aware of the conditions they are going to experience as they approach their destination.

# Transit and Mobility

- Rural residents need to get to jobs, shops and medical facilities
- 45% of rural elderly and 57% of rural poor without a vehicle
- 38% have no access to public transportation; a further 28% have little access

*Source: TCRP A - 21, 1999*

**2-8**

**Instructor's Notes:**

Provide the opportunity for participant interaction by asking questions on this topic before addressing the slide. Refer to transit and mobility issues that the participants raised in Exercise #1, if any.
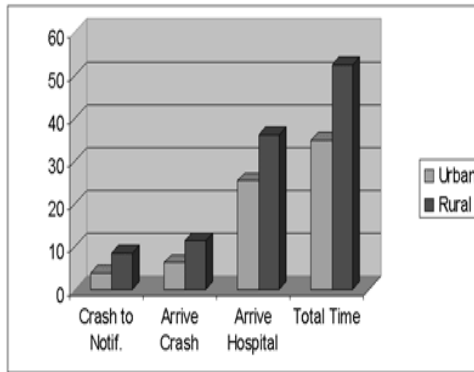
**Instructor's Script:**

What types of transit and mobility issues and challenges do you experience locally?

<Listen to and record ideas on the flip chart for about 1 minute. Then address the slide.>

Public transportation to provide mobility is extremely limited in most rural communities:

•In rural areas, the availability of some form of public transportation is not to provide a commuting alternative, as would we would think about it in an urban setting, but instead is a real quality of life issue for many rural residents.

•National statistics show that 45 percent of the rural elderly and 57 percent of rural poor have no access to a vehicle, and need some alternative means to get to their jobs, to the shops, or to get to medical appointments.

•Yet the statistics also show that 38 percent of the rural population has no access to public transportation, and a further 28 percent has only limited access.

*Source: http://www.arl.psu.edu*

**Instructor's Script:**

This slide shows a comparison of the emergency response times in both urban and rural settings:

Emergency response is made up of a series of phases:  the time it takes to notify the response agency after the crash occurs; the time it then takes for the responder to get to the crash site; and then the time it takes for the responder to get the crash victim to a medical facility.

The chart shows that emergency response time for each of these phase is longer in rural areas than it is in urban areas.  Overall, this adds up to a 30 percent longer response time in rural areas than in urban settings.

In many rural areas, the emergency response teams are volunteer organizations.  The responders have to first be called to the station from their homes or regular jobs before the team can be dispatched to the crash.

# Availability of Power and Communications

- Limited cellular communication coverage
- Limited power availability
- Limited wireless E-911 service



2-10

**Instructor's Script:**

The lack of what we would consider to be basic infrastructure can be a severe impediment in rural areas. The limited availability of a communications and power infrastructure can present challenges in rural areas.

•Many of the most remote rural areas have either limited or no cellular phone coverage, particularly those areas where there is not a compelling economic reason for the wireless providers to install cellular telephone towers and relay stations. In many other areas, even where a basic cellular infrastructure exists, the signals are disrupted by the topography or geologic formations. This means that if a traveler has a crash or needs help, they can't reach anyone on their cell phone.

• Many rural corridors do not have power running along them. This presents challenges and, usually, additional costs should an agency wish to install equipment in these areas

• Finally, most rural areas do not have enhanced wireless 911 services, which would allow a response agency to immediately pin-point the location of a traveler calling for help from a cell phone. In these instances, the response agency must ask the traveler to describe their location in detail – challenging at the best of times in remote rural areas, but especially so if the driver is disoriented from a crash or panicking in a disabled vehicle.

# Weather and the Environment



- Impacts include:

  _____, _____, _____,

  _____, _____, _____

- _____ total fatalities, (881 in snow/sleet)

- _____ total injuries, (63,000 in snow/sleet)

- $2 billion spent on snow and ice control each year

*Source: USDOT, National Highway Safety Administration, Traffic Safety Facts 2000*          **2-11**

**Instructor's Notes:**

Use this slide as an opportunity to interact with the participants.

**Instructor's Script:**

Can you describe some of the weather or other environmental impacts that affect the rural transportation system?

<Listen for a minute or so, then ask participants to write down the correct answers on the space provided on the slide. Add any impacts that weren't listed by the participants.>

**Impacts include: snow and ice, floods, fog, tornadoes, hurricanes, and forest fires**

What is the total annual number of fatalities and injuries on the rural transportation system that are attributed to weather and environment conditions?

Well there are about **7,000 total fatalities** attributed to poor weather on the transportation system, almost 900 of them occurring during winter storms. There are also another **450,000 total injuries** due to weather, 63,000 of those due to winter storms.

Also public agencies spend around $2 billion each year on snow and ice control.

What does this tell us? It tells us that the weather and other environmental impacts affect the safety and security of rural travelers, and have a major economic effect on public agencies.

# Maintenance and Operations

- Primarily a city and county responsibility
- Local agencies maintain 95% of rural unpaved roadways (3.1M miles) and 55% of rural paved roadways (926,000 miles)
- Limited budgets & resources
- Work zone safety

*Source:FHWA Highway Statistics 2000, Table HM-15*                    **2-12**

**Instructor's Script:**

Maintaining and operating the rural transportation system also presents a set of significant challenges:

•For example, city and county governments, rather than state transportation agencies, bear the responsibility for maintaining and operating the majority of the rural highway system.

•These local agencies maintain about 95 percent, or more than 3 million miles of the rural unpaved roadways, and about 55 percent, or almost a million miles, of rural paved roadways.

•To complicate the matter further, these rural local government agencies are often working with severely constrained budgets and resources.

•While work zone safety is a priority for transportation officials all across the country, it can be especially challenging in rural areas.  In the rural environment, motorists can unexpectedly come across work zones, often traveling at high speeds.  And even if motorists know about the work zone, the lack of alternative routes can lead to long delays, with motorists becoming frustrated and taking risks to get past the activity.

# Animal Conflicts



- Around 726,000 animal/vehicle crashes each year
- Property damage costs of around $1 billion per year

*Source:*
*Conover, M.R. Wildlife Society Bulletin, 1997*

2-13

**Instructor's Script:**

In rural areas, travelers will often unexpectedly come across wildlife on or near the roadway.

•There are approximately 726,000 animal/vehicle crashes each year

•And $1 billion in property damage costs is incurred annually from these animal/vehicle conflicts.

So we see that this type of crash has both safety impacts and significant economic impacts.
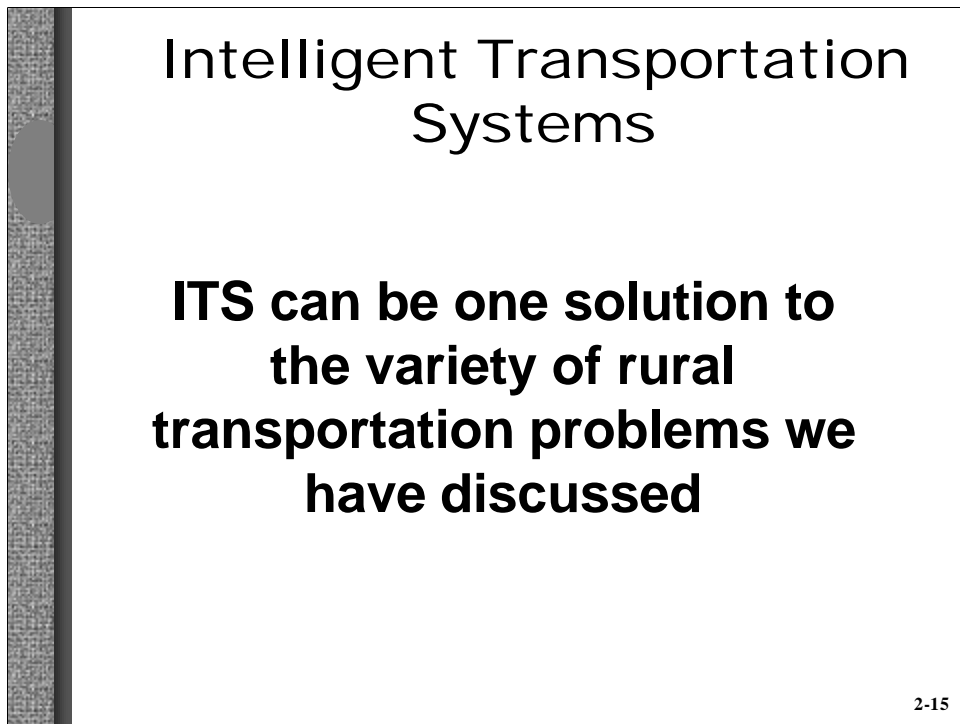
## Let's Review the Challenges!

- Recreational traffic
- Rural transit
- Emergency response
- Communications & power infrastructure
- Weather and environment
- Maintenance responsibilities
- Animal – vehicle conflicts

2-14

**Instructor's Notes:** Spend some time reviewing the rural challenges with the participants to reinforce them. Ask the participants to list and briefly describe three of the challenges before presenting the slide. Present the slide and briefly review the list. Emphasize that this list of challenges is not exhaustive.

**Instructor's Script:** So far we've identified and discussed some of the problems, needs and challenges that you have experienced locally with the rural transportation system. We've also demonstrated that your challenges are very similar to those experienced all across the country. While we review the list of challenges, keep in mind that this list may not be exhaustive and that there may well be other challenges that we have not covered. Also keep in mind that many of these challenges can exist together and serve to complicate one another.

•Concentrated traffic in recreational areas - causes problems due to congestion, limited travel information, route unfamiliarity, and limited transit and detour options.

•Rural transit - due to the long travel distances and sparse populations, there exist few transit alternatives for rural communities.

•Emergency response times - emergency response in rural areas can take 30% longer on average than in urban settings.

•Communications & power infrastructure – basic infrastructure can be lacking many rural areas.

•Weather and other environmental conditions - contributes to rural crashes, creates a large and expensive maintenance burden to agencies.

•Maintenance – the majority of rural roadway maintenance falls to city and county governments, often with limited budgets and resources.

•Animal-vehicle conflicts - represent a large number of rural crashes, with consequent safety and economic impacts.

# Intelligent Transportation Systems

## ITS can be one solution to the variety of rural transportation problems we have discussed

2-15

**Instructor's Script:**

It is now time to introduce the use of ITS as a potential solution to the various rural transportation problems and challenges we have been discussing.

# How is Transportation Technology Being Used?

- Extensive use in the nation's principal urban areas.
- Promising in rural areas to improve safety, security, mobility, and economic viability

2-16

**Instructor's Script:**

•Transportation technology now has a long, demonstrated track record in many large cities around the country.  It is becoming an increasingly mainstream tool to responding to congestion problems and mobility needs in urban settings.

•Transportation technology is also beginning to be proven as a solution in rural areas.  In this environment, transportation technology can provide a cost effective alternative to traditional solutions in responding to safety and mobility needs.

•Let's illustrate with one example of a technological application in a rural area.

**Instructor's Script:**

For those of you who have not experienced the benefits of transportation technology, here is an example:

A typical challenge for rural transportation agencies is to provide weather and road condition information to motorists in a timely manner to prevent crashes and delays.  Traditionally this has been addressed by placing static signs along the roadway that tell the motorists to tune in to an AM radio station to get weather information, or to stop at ranger stations or truck stops to get mountain pass and roadway information.  Obviously, this approach does not address the conditions as they happen in real time. However, the need for real time condition information is important to many travelers, especially those, like recreational travelers, who are unfamiliar with the area.  Transportation officials are therefore very interested in techniques for relaying current, accurate travel condition information to motorists.

Rural Transportation Technology Application Example

2-18

**Instructor's Script:**

A common  application of transportation technology that serves to address this need for current information is the Dynamic Message Sign or DMS.  These signs provide the opportunity for informing motorists of changing roadway conditions due to a wide range of incidents, such as weather, crashes, or construction activities.

# Using Transportation Technology in Rural Areas

- • Transportation technology is not the solution for every challenge we have discussed, but it has shown particular promise in solving some of the problems

2-19

**Instructor's Script:**

Transportation technology really provides an additional tool to the transportation agencies.

For the rural challenges and problems that we've discussed there are 3 options:

1. Agencies can choose to do nothing;

2. Agencies can improve the system by traditional means (for example by widening the roadway); or

3. Agencies can deploy some form of technology to address the problem.

So, while transportation technology is not a cure all for every challenge that we've discussed, it has shown particular promise in solving some of the problems.

# The Rural ITS Toolbox

- Rural ITS user needs were developed on a national basis
- Seven Development Tracks have been created to address user needs
- The Rural ITS Toolbox is structured around these development tracks

2-20

**Instructor's Notes:** At every opportunity have the participants hold and use the Toolbox document. At this point the instructor should begin using it as a prop.

**Instructor's Script:**

To help agencies identify the most appropriate potential technological solutions to their rural transportation needs and challenges, a resource document has been created. This document, called the Rural ITS Toolbox, has been produced by FHWA through a process which:

•First identified a very broad set of user needs for rural transportation systems. These user needs were identified by practitioners and subject matter experts from across the country through a series of FHWA-sponsored workshops.

•To make the very large number of user needs that emerged from the workshop easier to manage, they have been categorized into seven Development Tracks.

•These seven Development Tracks have then been used to provide the structure to the Rural ITS Toolbox.

# The Development Tracks

- Emergency Services
- Travel and Tourism Information
- Traffic Management
- Rural Transit and Mobility
- Crash Prevention and Security
- Operations and Maintenance
- Surface Transportation and Weather

2-21

**Instructor's Script:**

The seven rural ITS Development Tracks are as follows:

- Emergency Services
- Travel and Tourism
- Traffic Management
- Rural Transit and Mobility
- Crash Prevention and Security
- Operations and Maintenance
- Surface Transportation and Weather

# Matching Development Tracks with Challenges

- **Emergency Services**                30% longer response

- **Travel and Tourism**                Seasonal congestion

- **Traffic Management**                Work zone safety

- **Rural Transit and Mobility**        38% without service

- **Crash Prevention & Security**       60% of fatalities

- **Operations and Maintenance**        Local agency responsibility

- **Surface Transportation and**        Changing conditions
  **Weather**

2-22

**Instructor's Script:**

So by taking the time to clearly define our rural transportation needs and challenges we are then able to easily match these with an appropriate Development Track. In turn, this takes us into the right section of the Rural ITS Toolbox, and we can begin to review to potential technological solutions that are available to solve the particular problem we have.

We'll be exploring the use of the Toolbox to do this in much more detail in the next session.

# Learning Objectives

- Recognize transportation needs, challenges, and opportunities in rural environments
- Identify the seven rural ITS development tracks

2-23

**Instructor's Notes:**

Use this opportunity to interact with the participants again by asking them questions.

**Instructor's Script:**

•During this session we have learned to recognize the some of the transportation needs, challenges, and opportunities in a rural environment. What are two of the rural transportation challenges that we discussed earlier?

•We have also identified the seven rural ITS Development Tracks. Can you list all of the development tracks?

•Excellent. We'll take a short break now…

In the last session, session 2, we learned about the transportation challenges in rural areas and ITS development tracks . In this session we are going to learn about how to strategically plan for addressing those challenges and the use of transportation technology.

# Learning Objectives

- Describe the strategic planning process
- Identify key institutional stakeholders
- Describe options to maintain stakeholder involvement
- Identify alternatives for assessing needs
- Identify major activities within each process step

3-2

**Instructor's Script:**

These are the learning objectives for session 3. Upon completion of these objectives you will be able to demonstrate how the strategic planning process can be used for ITS deployment.

In this session we will learn the about the strategic planning process, and then look at the specific planning steps that are involved in the process. During the session discussion of the steps, we will pay particular attention to identifying the key stakeholders, describing mechanisms to maintain their involvement, identifying ways to assess needs that involve stakeholders. Finally we will highlight the major steps in the strategic planning process, including the development of regional architectures.

At the end of this session we will conduct an exercise that includes:

•prioritizing the challenges identified in Session 2,

•identifying the key stakeholders, and

•identifying methods to maintain their involvement.

# Describe Strategic Planning Process

The strategic planning process is a method by which all the stakeholders, user needs, and technology assets are integrated to realize an overall deployment goal.

3-3

**Instructor's Script:**

"The strategic planning process is a method by which all the stakeholders, needs, and technology assets are integrated to realize an overall deployment goal".

# Key Strategic Planning Process Steps

1. Gather and Expand Stakeholders
2. Assess Transportation Needs
3. Inventory Related Improvements
4. Define Regional ITS Architecture
5. Develop Strategic Deployment Plan

3-4

**Instructor's Script:**

In order to develop an effective strategic plan, five steps have been identified. These steps comprise:

1. Gather and Expand Stakeholders – this step is essential and critical to providing an overall view of how transportation and advanced technologies may impact the systems and services of different groups.

2. Assess Transportation Needs – this step will determine the needs of each of the applicable stakeholder groups.

3. Inventory Related Improvements – in this step all applicable technological improvements will be inventoried in order to understand how best to add value to those systems.

4. Define Regional ITS Architecture – in this step we define how the stakeholders, technology applications and systems communicate with each other to meet individual organization and regional needs.

5. Develop Strategic Deployment Plan – in this step we put all the pieces together to develop a scaleable and modular plan that addresses what, where, when, how, and why.

## Step 1: Gather & Expand Regional Partners

- Strategic planning requires input and broad involvement by different groups
- Stakeholders need to be actively involved in the process through a structured process
- Process
  - Identify champion (lead organization)
  - Form Steering Committee and develop business, management and outreach plan
  - Document input and keep stakeholders involved and informed

3-5

**Instructor's Script:**

Stakeholder involvement and developing institutional consensus is a critical step in the strategic planning process. In developing your partners it is important to involve a broad group of stakeholders so that all needs and opportunities can be identified. When gathering and expanding your regional partners it is important to have a structured and well thought out approach of

•Who is going to be involved, the lead organization and the champion for the plan?;

•How are decisions going to get made and by what criteria?

•How are we going to keep stakeholders and the public informed of our progress and success?

# Institutional Foundation

Advanced Technologies

Transportation Needs

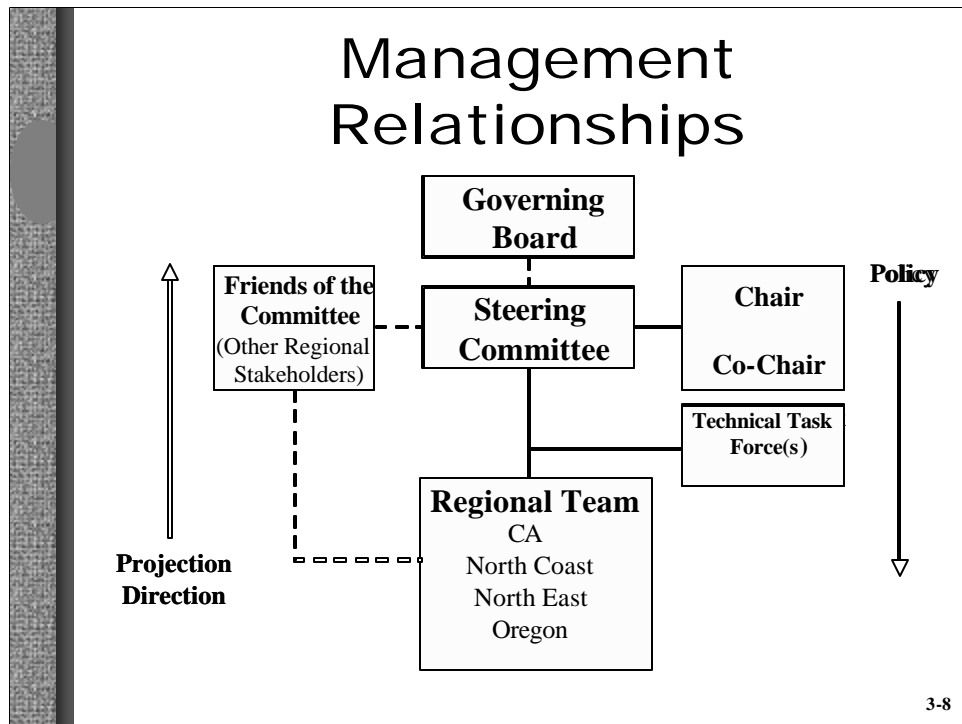Institutional Support

**3-6**
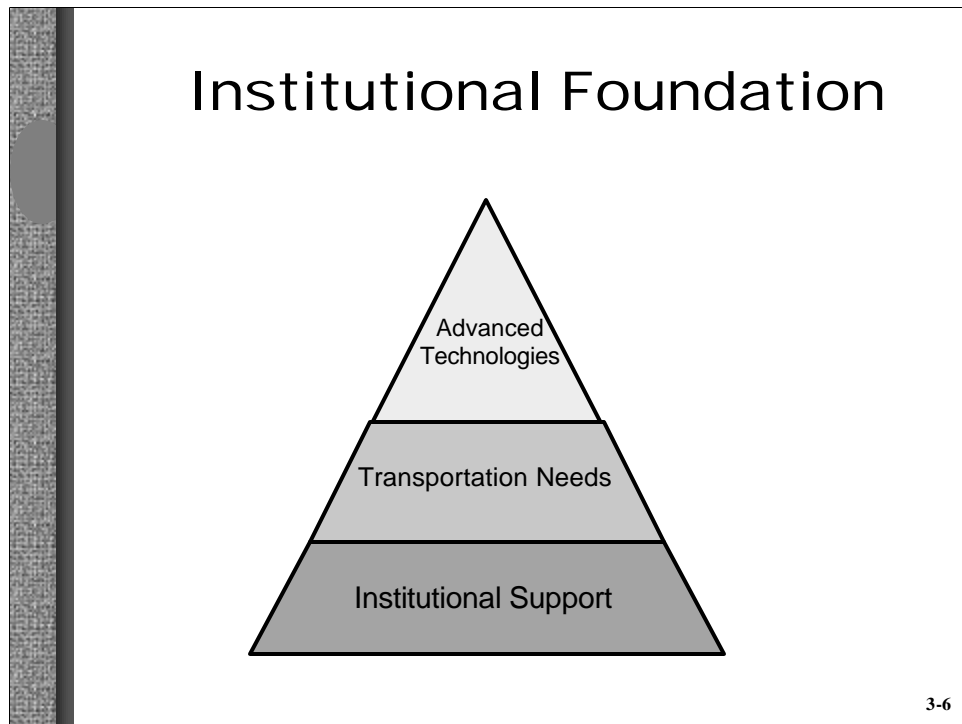
**Instructor's Script:**

Based on the experience of others throughout the United States it has been learned that a strong institutional foundation and positive relationship with your partners is the key to success in implementing and operating ITS solutions.

# Potential Partners

- **Local**
  - Gateway Community
  - Chambers of Commerce
  - Transit Operators/ Fleet Operators (trucking, delivery service)
  - Emergency Management/ Response Providers
  - Native American Organizations
- **Private**
  - Telecommunication companies
  - Concessionaire's

- **State**
  - Department of Tourism
  - Department of Commerce or Economic Development
  - Police/ Highway Patrol
  - Department of Transportation;
- **Federal/U.S.**
  - Department of Transportation (FHWA, FTA)
  - Forest Service
  - National Weather Service
  - National Park Service

3-7

**Instructor's Notes:** Do not try to describe each of this partners. Suggest that this is a list of potential partners in a rural ITS project. It is not necessarily comprehensive.

# Management Relationships



**Governing Board**

**Friends of the Committee** (Other Regional Stakeholders)

**Steering Committee**

**Chair**

**Co-Chair**

**Policy**

**Technical Task Force(s)**

**Regional Team**
CA
North Coast
North East
Oregon

**Projection Direction**

3-8

### Instructor's Script:

It is important to have an effective structure by which to make decisions regarding your strategic plan.  This schematic illustrates the project management structure adopted by the participants in a strategic plan in the northern California and southern Oregon region. Each level plays an important role and is integral to the success of the project.  The organizational structure shown provides for a framework to allow policy, project direction and action to work in a cooperative manner to meet different group interests.  It also allows for minimizing bureaucratic impediments by clearly defining roles and responsibilities of and management decisions of each group.

# Outreach Workshops

- Workshops used to identify transportation challenges and technology opportunities
- Benefits
  - Introduce project
  - Solicit viewpoints and awareness
  - Maintain interest and achieve long-term consensus
  - Develop public and private partners

3-9

**Instructor's Script:**

One method to gather stakeholder and partners is by conducting outreach workshops. The workshops bring together broad stakeholder group of individuals to discuss the regional challenges and opportunities.

The workshops are typically conducted in multiple areas throughout the project area and allow for participants to learn about the strategic plan and provide an opportunity to maintain a level of involvement. At these workshops it is important that all stakeholders be heard and their perspectives documented so that they feel part of the process. Also, these workshop allow for the development of partnerships with other public and private sector organizations.

# Lessons Learned

- Institutional buy-in key to success!
- Early winner is essential
- Need continuous stakeholder engagement and re-education
- Diverse stakeholders who may have limited multi-agency experience
- Limited funding with extreme competition
- Most familiar with traditional or low-tech approaches
- Transportation <u>not</u> the "hook"

**3-10**

**Instructor's Script:**

Those groups who have already gone through the strategic planning process have documented a number of lessons learned:

•Institutional buy-in is the key to success in strategic planning. Without involvement from all affected groups, any transportation system that is planned will be at a major disadvantage due to lack of support.

•A project that is an early success story can be extremely useful in maintaining the interest and support of the stakeholders.

•When it comes to the involvement of stakeholders, you cannot just educate them once on the project activities that are going on, it must be continuous. They need to be re-educated periodically to keep them in the loop.

•We have discussed the need for a diversity of stakeholders so that all groups are represented. One of the things that we have found out is that many stakeholder groups (whether they are DOT's, public safety organizations, or tourism organizations etc.) many times have very little experience of working together in a multi-agency program.

•It has also been found that the funding in rural areas is very limited, that leads to a heightened level of competition for funding within and between agencies.

•Many of the stakeholders that you engage in a program are typically most familiar with traditional approaches rather than with technological solutions.

•Oftentimes transportation is not the hook, that is to say that it is not the issue that brings people together. However, transportation can serve to pique groups' interest and get them involved. For instance, if a rural area's economic viability is dependent upon tourism, then transportation systems are a means to preserving that viability. Thus, while people may not be overly interested in transportation, they are always interested in the by-products that transportation systems provide.

# Step 2: Assess Transportation Needs

- Problem definition
- Problem prioritization
- Geographic area of focus

3-11

**Instructor's Script:**

The second step in strategic planning is to assess the needs.  When assessing the needs there are three things to keep in mind.

Problem Definition:  Defining the problem involves determining what the specific difficulties are. Depending upon a program's budget and time, the problems can be defined either qualitatively, quantitatively, or both.

Problem Prioritization:  Once the problems have been defined, it is necessary to determine in what order the issues need to be addressed.  Often times the deciding factor when it comes to prioritizing problems is the technical nature of the problems.  Highly technical issues will probably need to be addressed early on, and in a way that will be applicable and understandable to most of the stakeholder groups.

Geographic Area of Focus:  To keep stakeholder groups interest, it is important to establish a geographic area of focus with which they can relate. The groups now understand the "what" and the "how" of the problem, this part relates the "where".  This is a really crucial point that can be used to bring home the whole problem to the stakeholders.

# Problem Definition & Prioritization

- Methods:
  - Interviews (stakeholders)
    - Effective for buy-in and data collection
  - Surveys (stakeholders, travelers)
    - Intercept, mail-in
    - Quantitative data, cost effective and objective
  - Workshops
    - Addresses perceived needs and consensus
  - Quantitative data collection and analysis

**3-12**

**Instructor's Notes:** While presenting this slide, the instructor should solicit input from the participants on how they would define and prioritize the challenges within their region.

**Instructor's Script:**

There are a variety of methods for performing a needs assessment.

Interviews - conduct personal interviews of the stakeholder group representatives to identify problems and collect qualitative or quantitative data.

Surveys: conduct surveys (interceptive, mail-in, etc.) of stakeholders and the travelers. Although surveys can take some time to develop, collect, and analyze, this method has proven cost effective and it is less expensive than interviews.

Workshops: conduct workshops to obtain stakeholder input and buy-in. This method can be beneficial if all the stakeholder groups are present and allowed to voice their perceived needs. Workshops are more focused toward stakeholder groups, but it may be beneficial to have the public there too. Data collected in a workshop setting are mostly qualitative in nature, and the data can be hard to capture for the needs assessment and analysis purposes.

Quantitative Data Collection and Analysis:

The final method that can be used for needs assessment is also the most expensive, both in terms of time and money. Quantitative data collection and analysis provides a look at how conditions really are in the system, as well as how these conditions change with time. In order to use quantitative data for needs assessment purposes, a lot of data needs to be gathered to ensure against isolated observations. This method can be especially useful in reinforcing the perceived needs that are determined using the other three methods.

# Screening Criteria

| Goal | Performance Measure | Criteria |
|------|---------------------|----------|
| Safety | Road Closure | Type and Duration and Frequency |
| Safety | Emergency Response Time | Fatal crashes over 40 minutes |
| Mobility | Transit Dependent | Population (age, physical, income) over 40% |
| Economic Viability | Recreation Traffic/Expenditures | Annual visitors over 200K |

3-13

**Instructor's Script:**

An important step in finding ITS solutions is to determine which of the rural transportation needs are of the highest priority.  This table illustrates how criteria are established during the strategic planning process that allow you to screen for those most important transportation problems.  A formal process such as this also helps to identify which needs are real and which a just perceptions of a problem.

3-14

**Instructor's Script:**

This slide depicts an example of how quantitative data can be used to illustrate challenges that exist in a region. This example comes from the COATS project and illustrates the different emergency response times that were observed for different roadways in the project region. The GIS (Geographic Information Systems) map is used here to provide an illustration to stakeholders of where the challenges exist and the duration of the respective emergency response times. The graphical representation can be a powerful tool in presenting the information to stakeholders.

# Lessons Learned

- Quantitative data is beneficial but costly.
- Qualitative data can be perception based.
- Screening criteria should be used to determine priorities
- Graphical representations help achieve consensus

3-15

**Instructor's Script:**

Some lessons that have been learned in assessing transportation needs are that:

•The collection and analysis of quantitative data is beneficial to accurately assess the impacts. However it should be recognized that this approach typically can be expensive and time consuming.

•Qualitative data, while less expensive, can provide a sense of the challenges that exist.  A drawback is that these data can be perception-based.  That is to say that the challenges may not be as severe as perceived by the individual stakeholder groups.

•Screening criteria should be employed as part of quantitative data collection and analysis.  Thresholds must be established to gauge the severity of a problem and to develop priorities to a given challenge.

•Whenever possible, data should be graphically represented to help achieve consensus among different groups.

Step 3: Inventory Technology Related Improvements

- Identify the stakeholders' systems
- Understand current connectivity and planned upgrades
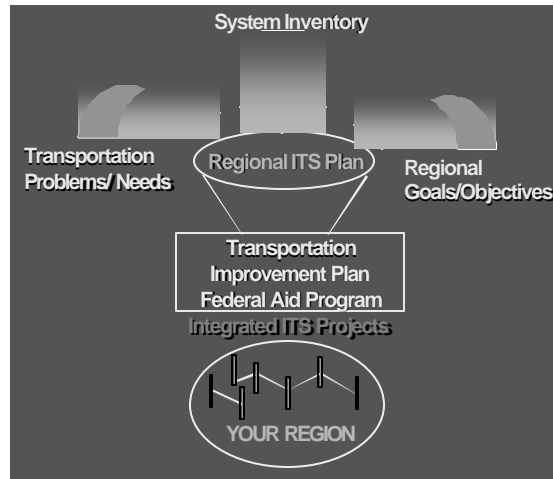
3-16

**Instructor's Script:**

In this step of the strategic planning process, an inventory of the existing and planned systems of all the stakeholder groups is conducted. The purpose of this is to gain an understanding of what each of the groups are planning with advanced technology, and to determine how to leverage that in the future. A system inventory allows planners to understand the current connectivity and planned upgrades to systems. When conducting this step, the inventory information that is typically collected includes the name of the person providing the information, their respective stakeholder group, whether the systems identified are planned or currently in existence, a brief description of the system, and a mapping to the National ITS architecture.

# Step 4: Define Regional ITS Architecture

"A regional framework for ensuring institutional agreement and technical integration for the implementation of ITS projects in a particular region."

– Identify integration opportunities
– Ensure efficient implementations
– Federally required for funding

3-17

**Instructor's Script:**

A regional ITS architecture is a framework for ensuring institutional agreement and technical integration for the implementation of technologies and systems in a given region.

Now you may ask yourself, "why would I develop a regional ITS architecture"?  There are many reasons why planners develop regional ITS architectures.  These reasons include:

Identify integration opportunities

•Development of regional architectures help to identify integration opportunities that may not initially be obvious.

•Development of regional architecture allows for the establishment of information sharing opportunities.

Ensure efficient implementations

•Architecture diagrams aid in preparing for future expansions.

•Architecture also aids in identifying opportunities for stakeholders to leverage funding.

Architecture and Standards Rule/Policy

• The development of a Regional ITS Architecture is required by U.S. DOT when using Highway Trust Fund money for ITS deployment.

# Step 5: Develop Strategic Deployment Plan

- Describes what, where, when, how, and why
- Regional framework and roadmap for identifying challenges and deploying technologies
- Provides information that stakeholders need
- A marketing and education tool (future)

3-18

**Instructor's Script:**

The final step is the actual preparation of the strategic deployment plan. This document provides the answers to what specific systems or projects should be implemented; where these solutions will be deployed; provides the timeline for deployment; describes the steps that will be gone through in order to implement, including the cost of the system and the source of the funding that will be used; and the benefits of implementing the solution. In essence, the plan is a regional framework and roadmap that identifies the rural transportation challenges and the ITS deployments that will provide the solutions. The deployment plan will contain the regional architecture, the system inventory, and the specific project definitions.

The plan should also serve to provide the information that each stakeholder needs to demonstrate why ITS is important to them and the region.

Ultimately, the deployment plan can be used as a marketing and education tool after it has been adopted. This is helpful when you want to share information about what is going on in the region.

# Overall Lessons Learned

- Planning and coordination is time intensive
- Involve multiple stakeholders – go beyond DOT
- Recognize institutional issues early
- Develop effective management structure
- Adopt regional philosophy through coordination/ integration

3-19

**Instructor's Script:**

Some of the overall lessons learned in developing a strategic plan include:

•Inclusive planning takes time and requires a dedicated effort.

•Developing the plan should involve all agencies and groups who are impacted by the transportation system and the potential ITS solutions, and not just the local or state department of transportation.

•Institutional issues should be identified early on and managed throughout the process.

•It is important to develop an effective management structure, so that everyone that is involved is kept in the loop.

•Adopt a regional philosophy to the deployment of ITS solutions by continuously considering coordination and integration opportunities and needs.

# Learning Exercise

- Prioritize Session 2 challenges (max. 4)
- Identify key stakeholders
- Identify methods to maintain stakeholder involvement

   – Time:  20 minutes

3-20

**Instructor's Notes:**

This learning exercise will build upon the Session 2 exercise in narrowing the general challenges to a prioritized list of four.   The class participants should ALREADY be divided into small groups (of less than 13 persons each.)

**Instructors Script:**

Introduce the goal for the exercise.  Then, pose the following: **"Let's get back into the groups we had before and review the set of challenges that each came up with in session 2.  We'll the take the next 15 minutes to develop a prioritized list of the top 4 challenges, and for each challenge identify the key stakeholders who need to be involved, and identify methods to keep them involved.  Once you've done that, I'll have someone from each group come up and present their group's results."**

Move around the class and interact with the groups as they develop their lists.  There is no right answer to this exercise, the overall idea is for the participants to attempt to anticipate future issues.

•After 15 minutes, ask the groups to share their lists.

•They should record responses on flip charts.

•This should be very rapid taking approximately 5 minutes.

Equipment:  Flip charts, markers, and tape.

Time: 20 minutes

## Session 3
## Learning Objectives

- Describe strategic planning process
- Identify key institutional stakeholders
- Describe options to maintain stakeholder involvement
- Identify alternatives for assessing needs
- Identify major activities within each process step

3-21

**Instructor's Notes:** These are the Learning Objectives that were established at the beginning of session 3. The instructor should now determine that the participants have met the learning objectives by asking questions. There is no need to read the list of learning objectives again.

**Instructor's Script:**

These are the learning objectives that we established for session 3.

Can someone list the 5 steps we described for the strategic planning process? For each of those 5 steps, who can give me one of the major activities that we would perform?

Can you give me examples of 3 key stakeholder groups that we would want to engage in the planning process?

Tell me what techniques that me might use to keep the stakeholders involved.

Can you list 3 different ways that we could perform a needs assessment?

Session 4
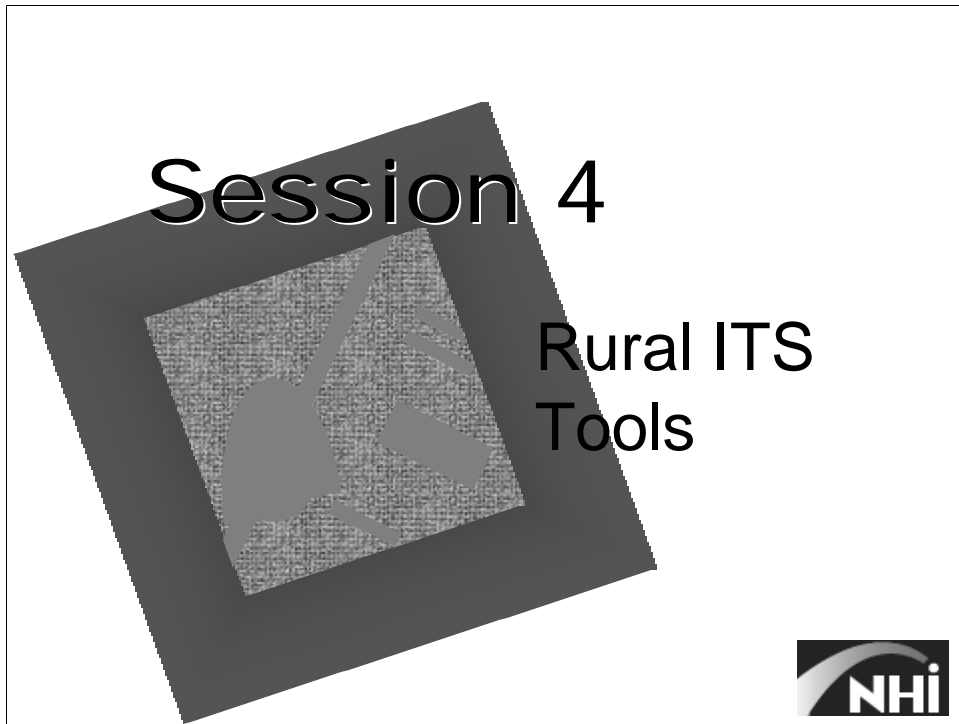
Rural ITS Tools

**Instructor's Script:**

Now let's talk about the tools that are contained in the Rural ITS Toolbox that provide an opportunity to address local and national challenges.

# Learning Objectives

- Demonstrate familiarity with the mapping of needs to the seven rural ITS development tracks
- Use the Toolbox to:
    - Identify technologies that are being used to address user needs
    - Recognize key stakeholders
    - Describe lessons learned by others
    - Describe typical qualitative benefits

4-2

**Instructor's Script:** These are the learning objectives for session 4. By meeting these objectives you will be familiar with the Toolbox and how it can be used to effectively select appropriate ITS solutions to address some of the rural transportation problems that we previously identified. You will also learn to use the Toolbox to find out about the issues that others have faced in their rural ITS implementation efforts.

**<First Bullet>** To make use of the Toolbox, it is necessary to first know a little bit about how it was developed. WE will discuss how rural ITS user needs have been mapped to the applicable tools through the development tracks.

**<Second Bullet>** During this session we will spend a lot of time looking at specific sections of the Toolbox document, and then we will be continuing our exercise by having each group select appropriate tools to satisfy the needs that you identified.

# Rural ITS Toolbox
# Purpose

- Serve as a resource document on successful rural ITS projects
- Share the developing body of information
- Avoid redundant efforts in developing your own solutions

4-3

**Instructor's Script:**

In recent years it has become common for states or regions across the country to consider ITS as a solution for their rural transportation needs. However, while there is a growing body of information these techniques, it has not been effectively shared with others who are considering embarking on similar efforts. Therefore, each group tends to start with only limited information of past experiences and has to develop their own techniques for developing solutions, often making similar mistakes to those who have already deployed a system. This document is therefore a resource for those who are about to start planning rural ITS deployments.

# Rural ITS Toolbox Organization

- By the 7 development tracks – main body of report
- By user need – appendix
- By geographic location - appendix

4-4

**Instructor's Notes:**  While discussing this slide, use the Toolbox document as a prop.  Open it to the relevant section and show it to the participants.

**Instructor's Script:**    As you will see the document is primarily organized around the seven rural ITS development tracks that we introduced in session 3. That makes it very important for you to be able to map the rural transportation needs that you identify to the appropriate development track.  We'll be talking about that more in a few minutes and will spend some time practicing that in the next exercise.  The toolbox document does also contain two appendices that also sort the various rural ITS tools by user needs and by the geographic location of that groups that have already deployed them.

# Rural Development Tracks

- Emergency Services
- Travel and Tourism Information
- Traffic Management
- Rural Transit and Mobility
- Crash Prevention and Security
- Operations and Maintenance
- Surface Transportation and Weather

4-5

**Instructor's Script:**

Since the rural ITS development tracks are a key part of using the Toolbox, let's revisit the list of the 7 tracks. We're going to spend the next few minutes discussing the scope of each track, to help you learn how to use the Toolbox and to help you map your identified user needs to the appropriate track. These 7 tracks were developed as a result of series of workshops sponsored by FHWA in 2000 that brought together practitioners in the relevant areas from the across the country.

As you look at the seven tracks it is important to remember that rural transportation needs are often inter-related and are not "stand alone". For example, weather conditions or maintenance activities can have a direct effect on emergency response. Consequently, the rural ITS development tracks and their tools are not "stand alone" either. Many of the tools we will be discussing could have been categorized in a different track, so it is very useful if you can develop an overview of all of the tools that are in the document before you set off on your deployment planning efforts.

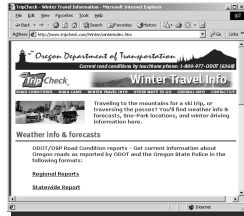Let's work through the seven tracks in turn now.
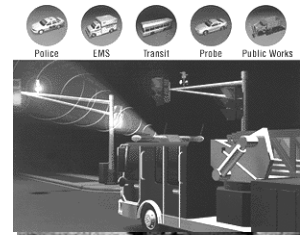
**Instructor's Notes:**  This series of slides will describe each of the development tracks and will provide the participants with a number of opportunities to use the Toolbox to find information.

**Instructor's Script:**

The emergency service development track begins on page 5 in your Toolbox. This track focuses on tools that can be used by law enforcement, fire departments, and emergency medical services.  These are organizations that must frequently work very closely together to respond to an incident. Emergency service agencies and transportation agencies are also very intertwined – for, example, the transportation system supports the delivery of emergency services, and is also responsible for generating many of the incidents to which emergency services agencies must respond.

This section of the Toolbox contains a series of tools dealing with signal pre-emption for emergency, accident investigation systems that can be used at the scene of a crash, and dispatching systems that support multiple emergency service providers.  It also describe mayday systems which allow 911, emergency medical, and transportation agencies to respond rapidly to a crash, and most importantly provide an accurate location of the crash site. If you open your Toolbox at page 7, you'll see how this approach has been used in Minnesota.
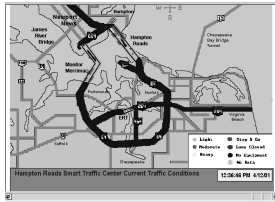
**Instructor's Script:**

The tourism and travel information track begins on page 17 in your Toolbox. This track focuses on providing the infrastructure, data, and data sharing capabilities needed to get important information to the traveler. This may comprise information that the traveler obtains before they set off on their trip or information that they can obtain while they are en-route to their destination. Typical information would relate to road closures, weather conditions, special events, construction activities, or information about tourist destinations, such as parking information, fees, or traffic congestion.

The tools in this section describe how agencies have handled providing traveler information through faxes, the telephone, kiosks, PDAs, roadside call boxes, or by radio and TV broadcasts. If you look at page 26 in the Toolbox, you'll see how Oregon DOT has used the internet to disseminate pre-trip information, and on page 29 you can see how Dane County, Wisconsin uses portable dynamic message signs to advise drivers that they are approaching a work zone.

# Traffic Management Track

4-8

**Instructor's Script:**

The traffic management track begins on page 43 in your Toolbox. This track deals with a variety of solutions to better manage and control traffic on the highway system. The tools in this section deal with applications such as better delineating the edges of lanes during poor weather conditions or on mountain passes; the use of CCTV and signal systems in rural areas; controlling access to freeways using gates; parking management systems; and managing safety around rural work zones. If you look at page 52, you'll see an application developed in Portland, Oregon to control flashing school zone beacons with pagers, and on page 54 there is a description of an application developed by Virginia DOT to manage traffic diversions in the Hampton Roads area.
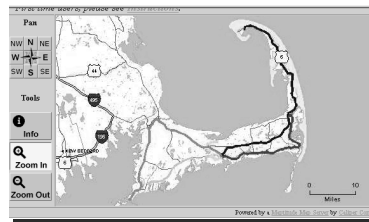
**Instructor's Script:**

This track begins on page 67 in your Toolbox.  The track focuses on enhancing access to transportation services to the rural elderly, disabled, or poor through ITS technologies, and using these systems to improve the efficiency and administrative operations of the service providers.  The tools in this section include the use of automatic vehicle location systems on transit vehicles and paratransit dispatching systems.  If you turn to page 71 in your Toolbox you'll also see an example of multi-agency dispatching from northern Minnesota.

# Crash Prevention and Security Track

4-10

**Instructor's Script:**

This track can be found starting on page 76 of your Toolbox. This track focuses on the prevention of crashes and the reduction of crash severity. The techniques described in this section use ITS technologies to assist in crash avoidance, hazard warning, including the protection of pedestrians and cyclists, work zone and highway-rail crossing alerts, and dynamic speed warnings. If you turn to page 77 in your Toolbox, you'll see an example of a system from Colorado that warns trucks if they are going too fast for an approaching curve, based on their vehicle class and weight, and a similar system from Washington State that warns motorist if they traveling too fast over a mountain passed based on the prevailing weather and roadway conditions.
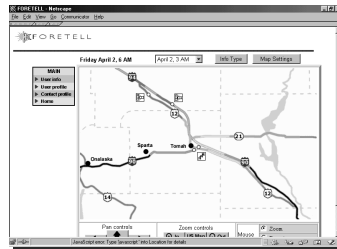
# Operation and Maintenance Track

4-11

**Instructor's Script:**

This track begins on page 100 in your Toolbox. This track focuses on improving the efficiency of the operations and maintenance activities of public agencies, and on accomplishing their responsibilities in the most cost-effective manner. These responsibilities include maintaining and improving the physical condition of the physical roadway infrastructure, and ensuring its safe operation under adverse conditions, such as during winter weather or construction and work zone activities. The tools described in this track include approaches that allow multiple agencies to share responsibility for operations functions, or to share information and data between agencies to make their operations more effective. The tools also include systems for managing highway lighting, controlling traffic signal systems, managing public fleets, detecting avalanches, and monitoring snow plow operations. If you look at page 115 in your Toolbox, you'll find an example from the City of Fort Collins, Colorado of using a very low-cost approach for deploying an anti-icing system on a rural bridge.

# Surface Transportation and Weather Track



4-12

**Instructor's Script:**

The final track, surface transportation and weather, begins on page 121 in your Toolbox. This track looks at the development of improved road weather information systems and maintenance technologies for winter mobility, and the development of traffic operations and incident management procedures for all weather events. In the Toolbox, there are examples of systems for better data gathering and processing; for weather information dissemination; and for integrated weather monitoring and surface condition prediction. If you look at page 121 of the Toolbox you'll find an example from Washington State that gathers weather information from a variety of sources, uses models to provide detailed weather forecasts around the state and to determine the effect of the weather on road conditions. This information is provided to state maintenance crews to make decisions about applying treatments, and is disseminated to the public through traveler information systems.

# Using the Rural ITS Toolbox

- • For each Tool:
  - – User needs addressed
  - – Description
  - – Real-world examples
  - – Lessons learned

  - – Benefits
  - – Opportunities
  - – Implementation
  - – Institutional issues
  - – References

4-13

**Instructor's Notes:**  This and the next slide are intended to introduce the participants to the detailed structure of each tool.  Following these two slides there are a series of slides that follow through two examples – one from the Toolbox, and one mocked-up and included in their workbook.  This slide and the next should be briefly discussed to highlight the content of each section.

**Instructor's Script:**

We are now going to talk about the content you will find for each tool in the Toolbox.  I'll give you a brief overview of the description you can find for each tool and then we'll work through a couple of examples in detail.  Once you have a good feel for what information you can find in the Toolbox, we'll move into our final exercise of the day.

Each tool that is included in the Toolbox is divided into sections as shown on this slide.  I'll briefly describe each section:

•Needs Addressed – This section describes the type of user needs that can be typically addressed by this tool.  These user needs will be like the ones that you developed in the first exercise this morning.

•Description – Then you will find a concise description of the tool, including a brief summary of the technical components, and any alternative options that could be used.

•Real-world examples – These describe practical applications of the tool that have been undertaken by an agency or group in the US.  We'll talk more about the real-world examples on the next slide.

•Lessons learned – This reports on some of the positive or negative experiences that have been found as agencies have deployed this tool

•Benefits - This section provides a discussion of the typical benefits that have been found when this tool has been deployed and used.

•Opportunities – In many cases, a tool has been used for applications other than the purpose for which it was first deployed.  This section describes those other applications.

•Implementation – This section describes the typical implementation process and highlights any particularly challenging issues that arose.

•Institutional issues – This section describes the typical institutional issues that were encountered in deploying the tool.

•References – A list of the references that were used to develop the description of the tool are included.

# Real-World Examples in the Toolbox

- For each example:
  - Goals
  - Approach
  - Location
  - Current status
  - Future activities
  - Cost information
  - Participants
  - Impacts
  - Key contacts

4-14

**Instructor's Script:**

Each tool contains at least one real-world example.  Each example contains the following information:

•Goals – A description of the goals that the application of the tool was intended to address.

•Approach – The approach taken by the deploying agency to develop, design, implement and operate the application

•Location – The location and geographic scope of the application

•Current status – for example, whether it is still in development or operational, etc.

•Future activities – what plans, if any, that exist for continuing to operate or develop the application

•Cost – The cost of developing and deploying the tool, and any information that might influence the cost of deployment in other locations

•Participants – A list of the organizations involved in deploying the application and how they participated

•Impacts – A discussion of the actual or expected impacts of the application on the problem to be solved

•Key contacts – individuals that you can contact to obtain more information on the application.

## Speed Warning Systems – Page 76

- Needs – slow traffic near intersections, work zones; slow commercial vehicles on mountain passes and tight curves
- Description – Advise safe speed based on geometry, weather, current speed. Include weight and classification for trucks

4-15

**Instructor's Notes:**

We're now going to work through three examples – two of these are printed in the Toolbox document, and one, which covers a very recent initiative, has been prepared in the same style as the Toolbox and is included in your workbook.

Our first example looks at speed warning systems and starts on page 76 of the Toolbox.

Needs – Speed warning systems are often used to alert traffic that is approaching high-volume intersections, work zones, or known high-accident locations. They are also effective where you need to slow commercial vehicles more than cars, such as on mountain passes or tight curves.

Description – In a typical configuration, the systems take account of the roadway geometry and prevailing weather and road conditions to determine a safe speed. They will then measure the speed of an approaching vehicle and advise it if it is traveling too fast and what is a safe speed. Systems that focus on commercial vehicles will also use weigh-in-motion and automatic vehicle classification to measure the weight and configuration of the truck and factor that into the safe speed calculation.

## Speed Warning Systems continued

- Benefits:
  - Fewer fatalities and injuries
  - Reduced property damage costs
  - Reduced incident management costs
- Lessons learned – favorable public perception
- Opportunities – Use signs for other warnings or advisories

4-16

**Instructor's Script:**

Agencies that have deployed speed warning systems have reported a number of benefits. These include important safety benefits, leading to fewer injuries and fatalities. There are also economic benefits to both travelers and operating agencies through lower property damage costs, and fewer occasions when an agency must manage an incident.

Lessons learned – deploying agencies report that they receive very favorable public response to safety improvement schemes such as this.

Opportunities – The signs that are use to advise motorists of the safe speed can also be used for other warnings and advisories, such as work zones ahead, winter weather conditions, or the need to use snow chains for example.

# Speed Warning Systems continued

- Institutional issues – Police involvement for speed enforcement
- Implementation issues – Calibration is critical; inaccurate speed readings lose credibility with public



4-17

**Instructor's Script:**

One institutional issue that has been identified concerns the need to have police involvement in the system operation, if an agency wants to use the system for speed enforcement.

It has also been noted that it is very important to keep the system accurately calibrated. If drivers see that there is a deviation between the speed that the sign says they are traveling and the what is shown on their speedometer, they quickly lose confidence in the system.

# Colorado Truck Speed Warning System

- Goals – Improve truck safety on steep grades
- Approach – Radar speed detection; dynamic message sign with "YOU ARE SPEEDING AT XX MPH. 45 MPH CURVE AHEAD"
- Location – I-70 at Glenwood Canyon
- Status – Operational since Sept 1996

4-18

**Instructor's Script:**

One of the real-world examples in the Toolbox is the truck speed warning system in Colorado. This is described in the box at the top of page 77 in the Toolbox.

Colorado DOT deployed this system at a steep grade location on I-70 near Glenwood Canyon that was known to have a history of severe runaway truck accidents. The system uses a radar gun to measure the speed of the approaching truck and then flashes a message on a dynamic sign telling the driver that he is speeding and telling him that he is approaching a 45-mph curve. CDOT has been using the system since 1996…

# Colorado Truck Speed Warning System

- Future – Leave permanently installed
- Impacts:
  - Before: 85$^{th}$ percentile speed = 66 mph
  - After: 85$^{th}$ percentile speed = 48 mph
- Cost – Initial deployment $25 - 30,000
- Participants – Colorado DOT
- Contact – Jim Nall, 970-248-7213

4-19

**Instructor's Script:**

… and they plan to leave the system permanently installed at this location. CDOT has evaluated the benefits of the system, and has seen 85$^{th}$ percentile truck speed fall from 66-mph before the system was deployed to 48-mph. CDOT reports that the deployment cost of the radar detection, processing hardware and software, and a small dynamic message sign was in the range $25 to $30,000.

# Weather Data Gathering/ Processing – Page 121

- Needs – provide weather/road condition info to travelers & maintenance operators
- Description – Gather weather data from multiple sources; use models for more accurate forecasts and to determine best maintenance response

4-20

**Instructor's Script:**

Our second example in the Weather Data Gathering and Processing tool that can found on page 121 of the Toolbox.

Needs – This tool recognizes that weather is one of the most requested types of information. Both travelers and highway maintenance operators have expressed the need for information about current and forecast atmospheric and road condition information.

Description – Beyond transportation agencies, various other groups collect and process real-time weather information. These include the National Weather Service and the Federal Aviation Administration. Greater value can be generated if the data from all these sources is combined. Once combined, these data can be used in models to create much more accurate and comprehensive forecasts and predictions of road conditions.. This information can be used by highway agencies to develop the appropriate and effective maintenance response.

## Weather Data Gathering/ Processing continued

- Benefits:
  - Lower infrastructure costs by sharing data
  - Cost savings to agencies
  - Better informed travelers
- Lessons learned – combining devices achieves statewide coverage quickly
- Opportunities – Collaboration with private sector weather sites

4-21

**Instructor's Script:**

Reported benefits from this tool include significantly lower costs to each agency by avoiding the deployment of redundant monitoring and sensor infrastructure.  Also by using the forecasts and predictions highway operating agencies can avoid unnecessary roadway treatments and consequently save money.  By disseminating the weather and road condition information to travelers they can be better informed and therefore safer.

Additional lessons learned by developers include the fact that by agencies sharing their respective sensor and monitoring infrastructures, statewide coverage can be achieved much more quickly than if any individual agency were to deploy separately.

Agencies that have deployed this tool suggest that there are additional opportunities to combine the data from public sector sites with those operated by private companies, such as commercial forecast companies and TV and radio stations that maintain weather monitoring sites.

# Weather Data Gathering/ Processing continued

- Institutional issues – data ownership
- Implementation issues – Ensure consistent data quality through use of standards
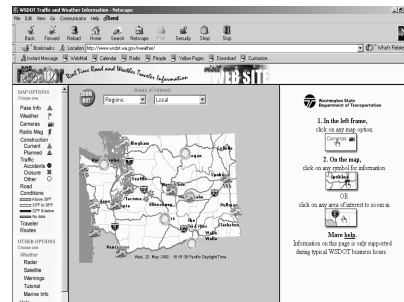


4-22

**Instructor's Notes:**

It has been suggested that one of the most challenging institutional issues relating to this tool is the fact that the data is coming from many different sources and agencies. There need to be agreements established to openly exchanged and use this data, and also to address any concerns about the ownership of the data and any rights in its subsequent use.

Also because the data comes from many different sources, it is important to ensure that it is of a consistent quality and accuracy. Use of appropriate standards for the placement and operation of sensor can help address this.

# Washington State rWeather Program

- Goals – Collect real-time/predictive statewide weather info
- Approach – Create dense monitoring network using DOT, airport, agricultural & environmental stations; use weather & road condition prediction models
- Location – 400 sites statewide
- Status – Project in development

**4-23**

**Instructor's Script:**

The real-world example we are looking at is the rWeather system from Washington State that is described in the box at the bottom of page 121 in the Toolbox. The overall goal of this system is to develop and deploy a statewide system that would provide real-time and predictive road and weather information.

The system uses a very dense network of monitoring sites operated by the Northwest Regional Weather Consortium. This is a cooperative of local, state and federal agencies that pool data from weather monitoring sites around the state. Their sources include agricultural monitoring networks, air pollution sensing stations, airport monitoring stations, and DOT road-weather information systems. Together this provides about 400 sites statewide. The data is then passed to a high-resolution weather prediction system to generate detailed forecasts around the state. The data also goes to road condition prediction model, which helps maintenance crews make decisions about when and where to apply treatments.

At the time of writing the Toolbox, the system was still in development…

# Washington State rWeather Program

- Future – Continued testing
- Impacts – TBD
- Cost – $1.25M USDOT + $312k WSDOT
- Participants – WSDOT; Univ. of Washington; NW Regional Weather Consortium
- Contact – Bill Brown, 206-616-6183

4-24

**Instructor's script:**

… and the system was undergoing continued testing and refinement.  For that reason there was as yet no formal evaluation of the system impacts.  The project has been funded by a $1.25 million federal grant and $312,000 of state matching funds.

# Traveler Information by Phone – Page 17

- Needs – Provide drivers weather & road condition information to make better travel decisions
- Description – Use the easy-to-remember national travel information number, 511, to provide pre-trip and en-route information

4-25

**Instructor's Script:**

The final example focuses on the provision of traveler information by telephone. A description of this tool can be seen on page 17 of the Toolbox. However, the real-world example that we have included is a recent initiative that is not yet documented in the Toolbox. We have therefore included the example in the same style as the Toolbox in your workbooks.

User Needs:

Traveler information by phone addresses pre-trip advisory and en-route information needs by providing traffic, construction, weather and road condition information to travelers.

Description:

This service is useful to pre-trip travelers who, by using the telephone menus, may judge the current conditions of the roadways and the other transportation modes. The advancement of cellular phones have also made this system available for use by en-route travelers. More recently, the FCC has designated the abbreviated dialing code 511 as a nationwide traveler information number. Several states and regions have begun deployment of 511 systems around the country.

# Traveler Information by Phone continued

- Benefits:
  - Improved info for operations
  - Centralized repository for info
  - Better informed travelers
- Lessons learned – system may be overloaded during peaks (e.g., severe weather event)
- Opportunities – Consider private sector sponsorship of the traveler info service

4-26

**Instructor's Script:**

Agencies that have deployed 511 systems and other phone-based information systems report that by making travelers better informed of conditions or hazards they may encounter on the highways leads to direct safety improvements. Also since the information used for these systems is typically gathered into a central repository is also easily accessible for their own operational needs.

It has been reported that these types of system tend to experience peak call loads during unusual events, such as a severe winter storm. It is these times that travelers are most anxious to receive up-to-date information and so it is important to design the system with these peak demands in mind.

It has also been suggested that there could be opportunities to offset some of the operating costs of these systems by partnering with the private sector and allowing them to run sponsorship or advertising messages in conjunction with the traveler information.

## Traveler Information by Phone continued

- Institutional issues – participation of telecom carriers is very beneficial
- Implementation issues – Customer feedback is necessary to shape service

4-27

**Instructor's Script:**

511 systems in particular require both the landline and the wireless carriers to reprogram their switches to point the incoming 511 call to the location of the information.  It has already been found that this will proceed much more smoothly and often at lower cost if there is a strong positive relationship with the telecom carriers.

Also since 511 is a customer-driven service, it can be very beneficial to solicit customer feedback to help shape the service and make it most valuable to the users.

# Travel Shenandoah 511 System on I-81 in Virginia

- Goals – Provide real-time weather, traffic and construction info for the I-81 corridor
- Approach – Implement a voice interactive 511 system in cooperation with landline & wireless telecom carriers
- Location – 325 miles of I-81 from WV to TN
- Status – Operational since Feb 2002

4-28

**Instructor's Script:**

This real-world example of a rural 511 system is included in your workbooks. The intent of this project was to build on an existing collaborative traveler information system that had been implemented by Virginia DOT and Shentel, a local telecommunications and internet service provider, to create a 511 system for the entire I-81 corridor in Virginia from the West Virginia line to the border with Tennessee. The 511 system that has been operation since February 2002 uses a voice interactive technology that allows callers to speak their commands to the system without having to punch keys to work through the menus.

## Travel Shenandoah 511 System on I-81 in Virginia

- Future – Continued operation and statewide expansion
- Impacts – Averages 7,000 calls per month
- Cost – $535,000 annually
- Participants – Virginia DOT; Shentel; Virginia Tech
- Contact – Todd Kell, 804-786-2451

4-29

**Instructor's Script:**

The system is now in full operation along the I-81 corridor and plans are being developed to extend the service to other parts of the state. The system currently receives 7,000 calls per month but can experience significantly more calls during peak periods such as an event like a snowstorm. The 511 system costs $535,000 annually to operate. However, VDOT has entered into a revenue sharing arrangement with Shentel that allows them to offset their costs using a portion of the advertising revenue generated.

# Learning Exercise
## Part 1

- For 2 top priority challenges:
  - Identify applicable development tracks
  - Identify 1 or 2 applicable rural ITS tools
  - For each tool identify:
    - stakeholders you would engage
    - how you would address the lessons that others have learned
    - what benefits you would expect

- Time:  60 minutes

4-30

**Instructor's Notes:** This exercise will be undertaken in 2 parts and will build on the Session 3 exercise, where participants prioritized the local and regional challenges. In the first part of this exercise participants will identify development tracks and tools that address those prioritized challenges.  In the second part they will identify potential institutional and implementation issues associated with the deployment of two of the tools.

**Instructor's Script:**

We will now conduct an exercise that will give you an opportunity to use the Toolbox and to reinforce what you learned in this session.  In this exercise you will identify the applicable development tracks and will select tools that satisfy your top two priority need that you identified in session 3. Once you have selected your set of tools, consider which specific stakeholders you would need to involve – you may want to look back at the overall list of stakeholders that you developed during session 3; think about the lessons learned by others in deploying these tools and what you would do to take advantage of these lessons; and finally think about the benefits that you might expect by deploying each of the tools.  We'll get back into the same small groups and then lets take the next 40 minutes to identify the tracks and tools.  Then we'll have 20 minutes for presentations from each break-out groups.

**Instructor's Notes:**

Move around the class and interact with the groups as they develop their lists.  There is no right answer to this exercise, the overall idea is for the participants to make practical use of the Toolbox.

•After 40 minutes, ask the groups to share their lists.

•This should be done rapidly and take approximately 20 minutes.

Equipment:  Flip charts, markers, and tape.                    Time: 60 minutes

# Learning Exercise
# Part 2

- Identify potential institutional and implementation issues for two of the selected rural ITS tools
- Develop these in the context of the needs you are using the tools to respond to
- Time:  30 minutes

4-31

**Instructor's Notes:** This is a continuation of the previous small group exercise that will challenge the participants to identify any institutional issues and implementation considerations that would arise if they were to deploy two of the ITS tools they identified in the previous exercise.

**Instructors Script:**

Let's take the next 20 minutes and develop a list of some of the institutional issues and implementation considerations that you think may arise if you we re to deploy two of the tools that you selected in the previous part of the exercise.  As you develop the list of issues, think back to the original needs and challenges that you identified and which you selected the tools to solve.  At the end of the 20 minutes, I'll have each group come up and present their list of issues.

**Instructor's Notes:**

Move around the class and interact with the groups as they develop their lists.  There is no right answer to this exercise, the overall idea here is for the participants to attempt to anticipate future issues.

• After 20 minutes, ask the groups to share their issues.

• Briefly discuss the differences and similarities between the lists.

• Explain that the issues, although difficult to foresee, can often be prevented or at least minimized by using the strategic planning process.

*Equipment:  Flip charts, markers, and tape.*                      *Time: 30 minutes*

# Learning Objectives

- Demonstrate familiarity with the mapping of needs to the seven rural ITS development tracks
- Use the Toolbox to:
  - Identify technologies that are being used to address user needs
  - Recognize key stakeholders
  - Describe lessons learned by others
  - Describe typical qualitative benefits

4-32

**Instructor's Notes:**  These are the Learning Objectives that were established at the beginning of session 4.  The instructor should now determine that the participants have met the learning objectives by asking questions.  There is no need to read the list of learning objectives again.

**Instructor's Script:**  These are the learning objectives that we established for session 4.

**<First Bullet>** Can someone tell me two of the user needs that you identified in session 2 and which of the development tracks that you mapped them to?

**<Second Bullet>** For one of the tools that you selected can you identify 2 or 3 of the stakeholders that you would need to have involved in its deployment?

**<Third Bullet>** Describe one of the lessons learned from the Toolbox that you felt would be important if you were deploying one of the tools.

**<Fourth Bullet>**  Who can list a couple of the benefits that you would expect to see if you deployed one of the tools?

Session 5

**Information Resources
and
Course Summary**
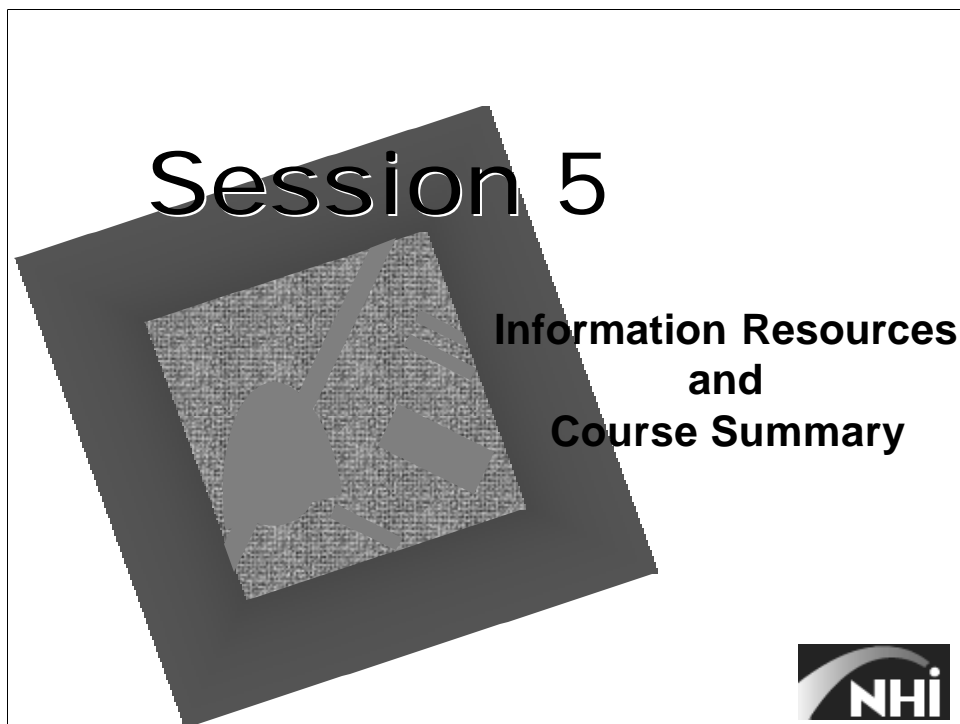
**Instructor's Script:**

In this final session I want to provide you information on how to find some additional reference material on rural ITS and some related topics. We'll also review what we've learned in the course today.

# Learning Objectives

- Identify two additional resources
- Briefly summarize the course

5-2

**Instructor's Notes:**

At the end of this session you will be able to identify two additional resources that will assist you in planning for and deploying rural ITS solutions.  You will also be able to provide a summary of the course that you took today.

# Information Contacts

- Local ITS America Chapter
    (202) 484-4847
- Local FHWA representative
    Toll Free "Help Line"
    (866) 367-7487
- ITS Resource Guide 2002

ITS/Operations Resource Guide
2002

incident management
    road weather management

intelligent vehicle initiative

traveler information/511

transit management systems

5-3

**Instructor's Notes:**

If you want to find other groups and individuals in your area that are interested in ITS and rural applications you may want to contact ITS America about your local chapter or contact FHWA to find who can help you in the Division office or Resource Center. The free ITS resource guide that is published annually can also point you to other experts in US DOT who can answer your questions on rural ITS, and other ITS and operations topics.

# Information Contacts

- ## USDOT ITS Peer-to-Peer Program
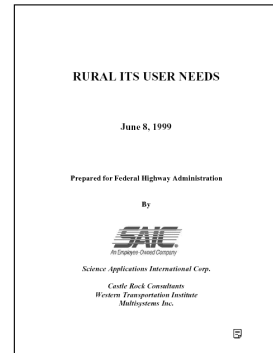  ### (888) 700-7337



5-4

**Instructor's Notes:**

You can also contact the USDOT ITS Peer-to-Peer Program to have a national expert assist you.

# Information Resources

- Rural ITS User Needs Document
- Rural ITS Toolbox

**RURAL ITS USER NEEDS**

June 8, 1999

Prepared for Federal Highway Administration

By

*SAIC*
*An Employee-Owned Company*

*Science Applications International Corp.*

*Castle Rock Consultants*
*Western Transportation Institute*
*Multisystems Inc.*

5-5

**Instructor's Notes:**

You have received the Rural ITS Toolbox as part of your course materials today. The Rural ITS Development Tracks that provide much of the structure to the Toolbox were developed as part of a nationwide user needs assessment. A report on that assessment is available through US DOT.
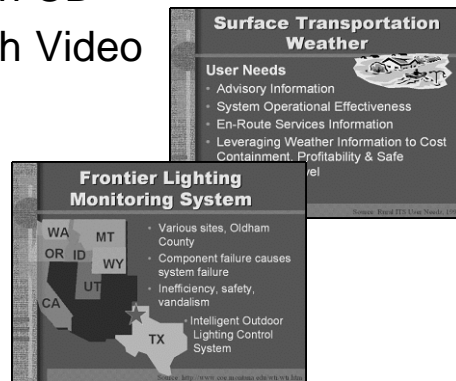
# Information Resources

- Best Practices in Rural and Statewide ITS Strategic Planning
- ITS Simple Solutions

5-6

You may also want to read the companion document to the Rural ITS Toolbox - the best practices in rural and statewide ITS strategic planning. Or the predecessor to the Rural ITS Toolbox called ITS Simple Solutions. Both documents are available form US DOT and can be found at the electronic document library.

# Information Resources

- ARTS Outreach CD
- ARTS Outreach Video

**Surface Transportation Weather**

**User Needs**
- Advisory Information
- System Operational Effectiveness
- En-Route Services Information
- Leveraging Weather Information to Cost Containment, Profitability & Safe Travel

**Frontier Lighting Monitoring System**

- Various sites, Oldham County
- Component failure causes system failure
- Inefficiency, safety, vandalism
- Intelligent Outdoor Lighting Control System

5-7

**Instructor's Notes:**

Other multi-media materials that are available and can be used for outreach are a compact disc that contains power point slides of the rural challenges and example projects, and a video which describes Advanced Rural Transportation Systems

# Internet Resources

http://www.itsa.org/

http://www.its.dot.gov

http://www.its.dot.gov/staterpt/state.htm

5-8

**Instructor's Notes:**

Additional web-based ITS resources are also available including ITS America, US DOT's ITS site, and part of the DOT site that describes ITS activities in each state.

# Internet Resources

http://www.benefitcost.its.dot.gov/.

http://www.coe.montana.edu/wti/

**ITS Benefits and Unit Costs Database**

HOME · AVAILABLE DOCUMENTS · SECTION 508 · PRIVACY STATEMENT

**Western Transportation Institute**
Montana State University-Bozeman

| WTI-Home | Who Are We? | What do we do? | Where are we? | How can we help you? | Contact Us | Downloads |

5-9

**Instructor's Notes:**
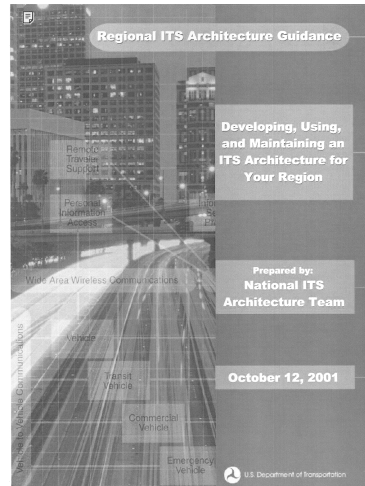
You can find out about specific ITS benefits and costs at the

FHWA site www.benefitcost.its.dot.gov.

Finally if you want to learn about rural transportation and ITS you can contact
the Western Transportation Institute at Montana State University
at www.coe.montana.edu/wti/.

**Instructor's Notes:**

Additional guidance documents and handbooks include the Regional ITS Architecture Guidance Document – which covers lessons learned in the development of regional architectures

# Related Courses

- National Highway Institute (NHI)
  **www.nhi.fhwa.dot.gov/**
- Professional Capacity Building
  Program (PCB)
  **http://www.pcb.its.dot.gov/**
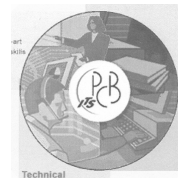


5-11

**Instructors Script:**

A variety of training courses are offered by the National Highway Institute, and  through FHWA Professional Capacity Building. Participants are encouraged to review these organizations' website to learn more on the specifics of the course contents.

# Course Goals

- Introduce the Rural ITS (Intelligent Transportation Systems) Toolbox
- Increase familiarity with ITS strategic planning

5-12

**Instructor's Notes:** The instructor shall now preview the course goals. Give the participants a little background as to why this course has been developed, and why they are here.

**Instructor's Script:**

Due to a stated need by rural transportation agencies, the FHWA developed the Rural ITS Toolbox to aid in the deployment of ITS solutions in rural areas. While there is a body of experience in this arena, the information has not been effectively shared. A chief reason for the development of this document is to assist in making this body of experience more accessible to potential new users. This course will teach you how to use the Toolbox effectively by introducing the Rural ITS Toolbox, and by familiarizing you with the technology and transportation strategic planning process.

# Course Learning Objectives

- Identify rural transportation needs and challenges
- Define transportation technology
- State the value of Rural ITS Toolbox
- Describe key factors in ITS strategic planning
- Explain the benefits of rural transportation technology
- Relate lessons learned in rural transportation technology
- Identify additional information resources

5-13

**Instructor's Notes:**  Summarize the course learning objectives that were introduced in Session 1.  These objectives were the keys to realizing the Course Goals, and were to be addressed and revisited throughout the course in order to be effective.

**Instructor's Script:**

At the end of the day, our course goals will be realized by accomplishing the following:

•Identify the current rural transportation challenges and issues.  We want to know your challenges, and then we will compare them to the compiled User Needs that have been collected by the FHWA.

•Define transportation technology and describe how it can be used in rural areas. What makes up transportation technology?  How is it used?

•Relate the value and utility of the Rural ITS Toolbox by demonstrating how it can be used.

•Describe ITS strategic planning.  What is it?  When is it necessary?  Benefits?

•Explain the benefits of rural transportation technology .  In what situations is it effective?  What rural problems do not have transportation technology solutions?

•Relate the lessons learned in rural technology and transportation .  This will be accomplished by citing project examples currently in deployment.

•Identify other information resources.  This course is one of many that are available from NHI to learn more about ITS and strategic planning.

# Needs and Challenges

- **Emergency Services**                30% longer response

- **Travel and Tourism**                Economic Viability, high visitation, limited services

- **Traffic Management**                limited detection, need for coordination

- **Rural Transit and Mobility**        38% without service

- **Crash Prevention & Security**       60% fatalities

- **Operations and Maintenance**        Local agency responsibility

- **Surface Transportation and Weather**   dynamic conditions, life-threatening

5-14

### Instructor's Script:

We started session 2 this morning by discussing the transportation needs and challenges that exist in rural environments. We began by talking about needs from a national perspective and then did an exercise where you identified some of the local needs and challenges. Can you remind me of a couple of the needs that you listed?

Later on we showed how we can map those needs to rural ITS development tracks. This is important because it allows us to use the Toolbox, which is structured around the development tracks, as a resource.

# Key Strategic Planning Process Steps

1. Gather and Expand Stakeholder Partners
2. Assess Transportation Needs
3. Inventory Related Technological Improvements
4. Define Regional Technological Architecture
5. Develop Strategic Deployment Plan

5-15

**Instructor's Script:**

In session 3 we discussed the strategic planning process. We described 5 steps that comprise the strategic planning process. We talked a lot about the importance of engaging all of the affected stakeholders in the planning and deployment process. Beyond those of you who are in the room today, please remind me of a couple of other key stakeholders that you felt should be involved.

We talked briefly about the development of a regional ITS architecture, and mentioned that it is required if you want to use federal-aid dollars for your ITS project.

## National ITS Architecture
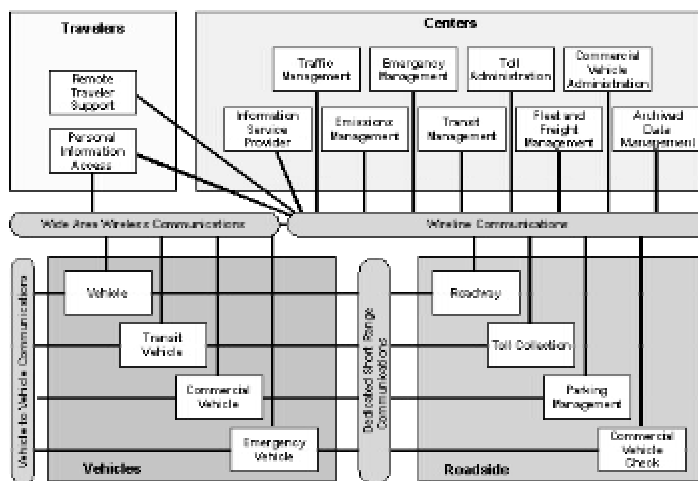
**Instructor's Notes:**

It is important to remember, however, that a regional ITS architecture is much more important than that. A regional ITS architecture shows how information will be passed between the travelers, the vehicles, the roadside systems, and the centers that control systems and disseminate information. As you develop your regional architecture remember that it is a process that needs to maintained. Once the initial architecture has been prepared it will become obsolete as new systems are deployed if they are not incorporated into the architecture. We could spend only limited time discussing the architecture process today, and so I would remind you that there are additional NHI courses available that focus specifically on that topic.

# Strategic Planning Lessons Learned

- Planning and coordination is time intensive
- Involve multiple stakeholders – go beyond DOT
- Recognize institutional issues early
- Develop effective management structure
- Adopt regional philosophy through coordination/ integration

5-17

**Instructor's Script:**

We concluded the strategic planning discussion in session 3 by looking at some overall lessons learned. We talked about the importance of recognizing institutional issues early on and putting the time into managing them, particularly because so many of the rural ITS projects need to involve many different agencies and jurisdictions to be successful. Can you remind me of a couple of the institutional issues that you identified in your final exercise that might occur locally?

# Rural ITS Toolbox

- Serve as a resource document on successful rural ITS projects
- Share the developing body of information
- Avoid redundant efforts in developing your own solutions

5-18

**Instructor's Script:**

We have also spent a lot of time using and learning about the Toolbox document. Can someone tell me the three different ways in which information can be found in the Toolbox?

**Answer:** The main body of the document is organized by development track, and there are 2 appendices – one organizes the tools by user need, and one organizes them by location.

Tools

5-19

**Instructor Notes:**

Finally, we spent some time looking at three example tools – two that are in the Toolbox document and one that we prepared for your workbook.  You also had an opportunity through the final exercise to use the Toolbox and select some tools that would be appropriate to your local rural transportation needs and challenges.

| | |
|---|---|
| What as an Emergency Service Tool? | Emergency vehicle signal preemption |
| What was a Travel and Tourism Tool? | Kiosk for traveler information or 511 |
| What was a Traffic Management Tool? | Closed circuit television camera |
| What was a Transit and Mobility Tool? | Central dispatch system |
| What was a Crash Prevention and Security Tool? | Speed Warning System |
| What was an O & M Tool? | Automatic Anti-Icing System |
| What was a Surface Transportation and Weather Tool? | #SAFE Weather Information Dissemination System |

# Learning Objectives

- Identify two additional resources
- Briefly summarize the course

5-20

**Instructor's Notes:**

These are the learning objectives for this final session. Can some tell me which two of the additional resources that we listed on the earlier slides that you're planning to look at after you leave here?

When you get into the office tomorrow and someone asks you what this course was all about, can one of you tell me how you are going to describe it?

Thank You

**Instructors Script:**

Well that's the end of today's course. I appreciate your attention and all of your hard work in the exercises. Please remember to leave behind the course evaluation forms. I hope that you all feel well prepared to now go off and start planning and deploying rural ITS solutions!