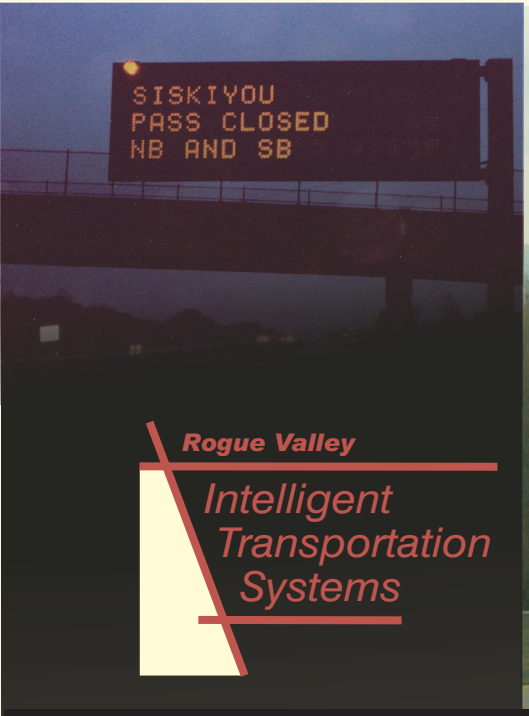
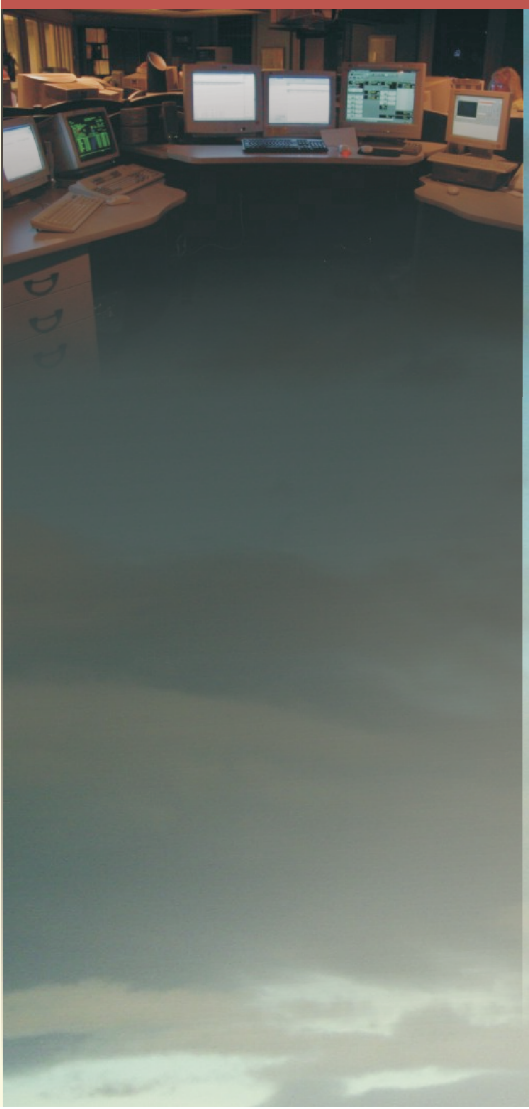


Rogue Valley
Intelligent Transportation Systems

Regional ITS Operations & Implementation Plan for the Rogue Valley Metropolitan Area

Executive Summary - July 2004



Prepared by

DKS Associates
TRANSPORTATION SOLUTIONS

And

Castle Rock Consultants

In association with

ODOT
Jackson County
City of Medford
Rogue Valley Council of Governments
Rogue Valley Metropolitan Planning Organization
Rogue Valley Transit District
Federal Highway Administration
Southern Oregon Regional Communications

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Rogue Valley Intelligent Transportation Systems

Project Background

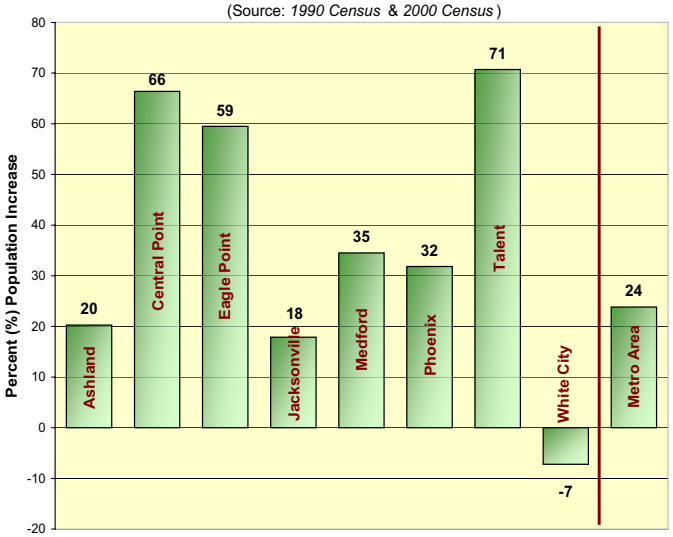
The Regional Intelligent Transportation System (ITS) Operations & Implementation Plan for the Rogue Valley Metropolitan Area was collectively developed by the Oregon Department of Transportation (ODOT), Jackson County, the City of Medford, the Rogue Valley Transportation District (RVTD), and the Rogue Valley Council of Governments (RVCOG). The outcome of this plan is a 20-year deployment of ITS projects, which include advanced technologies and management techniques, aimed to improve the safety and efficiency of the transportation system. This effort is consistent with plans put together in other regions statewide to ensure that ITS strategies used are integrated and complementary. This document presents the Executive Summary of the Final Report.

The Problem

Increasing traffic congestion, due to capacity constraints and incidents, affects the mobility of travelers within the Rogue Valley metropolitan area. Congestion results in travel delay, reduced productivity, and a frustrated driving public.

1990 - 2000 Population Growth

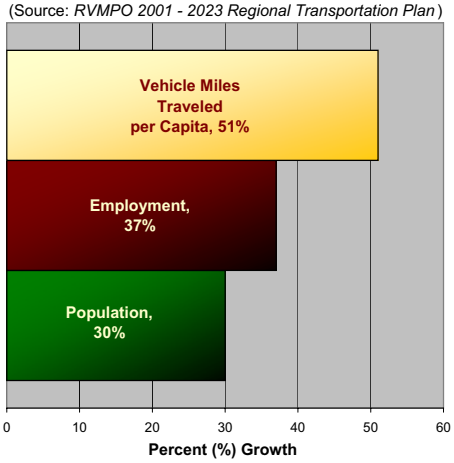
(Source: *1990 Census* & *2000 Census*)



According to the *2000 Census*, the population in the Rogue Valley metropolitan area grew 24 percent from 1990 to 2000, and per the *Regional Transportation Plan,* RVCOG forecasts that the metropolitan area population will grow 30 percent from 2001 to 2023 and employment will grow 37 percent. RVCOG also expects a 51 percent increase in vehicle miles traveled (VMT), which is a jump from 2.25 million miles per day to 3.4 million miles per day. The expected growth in population, employment, and VMT will place an enormous burden on the existing transportation infrastructure.

2001 - 2023 Forecasted Trends

(Source: *RVMPO 2001 - 2023 Regional Transportation Plan*)



As the region grows, public agencies must realize that high land and construction costs and environmental constraints make it difficult to build new transportation infrastructure as the single means of relieving congestion. Therefore, a systematic approach is necessary to effectively manage the region's transportation system and capitalize on the existing infrastructure as the region grows. This includes a combination of intelligent transportation systems (ITS) in conjunction with new roadway construction.

The Opportunity

ITS Applied to Existing Roadways

ITS applications offer a significant opportunity to improve the efficiency and safety of the surface transportation system in the Rogue Valley metropolitan area. These applications help improve transportation system operations by performing a function more quickly or reliably or by providing a service that was not previously available. As a result, ITS helps improve the mobility of people and goods on the existing roadway infrastructure and also offers the potential for substantial savings on future construction, particularly of highways. Often, the importance of investing in operations is easily overlooked, but is necessary to ensure that the traveling public makes safe and efficient use of existing roadways.

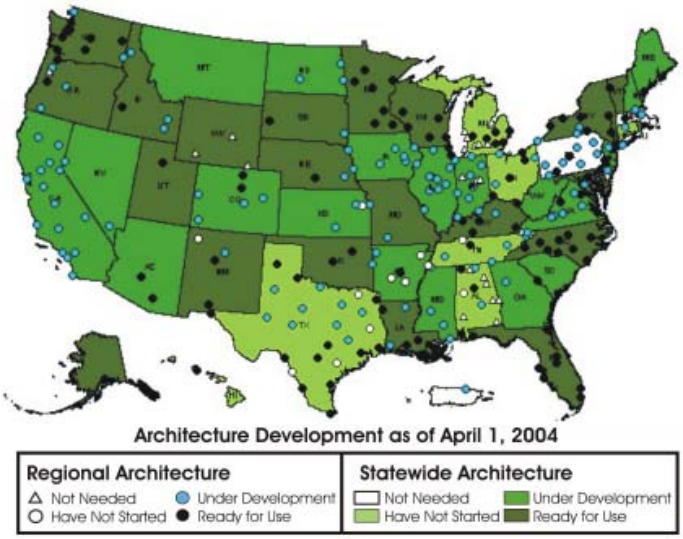
Project Background

What is ITS?

Intelligent Transportation Systems (ITS) involve the application of advanced technologies and proven management techniques to relieve congestion, enhance safety, provide services to travelers, and assist transportation system operators in implementing suitable traffic management strategies. ITS focuses on increasing the efficiency of existing transportation infrastructure, which enhances the overall system performance and reduces the need to add capacity (e.g., travel lanes). Efficiency is achieved by providing services and information to travelers so they can (and will) make better travel decisions and to transportation system operators so they can better manage the system.

Why Develop an ITS Plan?

An ITS plan provides a framework of policies, procedures, and strategies for integration of a region's existing resources to effectively meet future regional transportation needs and expectations. The following reasons provide the basis for developing an ITS plan for the Rogue Valley metropolitan area:

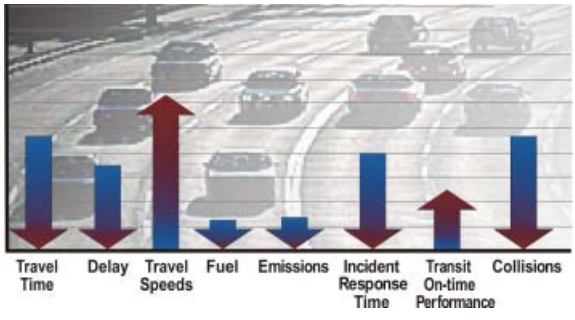


- The region cannot build itself out of congestion.
- The region endeavors to maximize the efficiencies and improve the safety of the existing infrastructure.
- The public demands better information about traffic congestion.
- The plan fosters multi-agency coordination for system operations.
- The Federal Highway Administration requires that all ITS projects funded through the Highway Trust Fund shall be in conformance with the National ITS Architecture and applicable standards by April 2005.

What are the Expected Benefits?

Intelligent Transportation System projects are aimed at improving the safety and operational efficiency of our existing transportation infrastructure by reducing vehicle delays related to recurrent and non-recurrent congestion, reducing accidents and incident response times, and providing travelers with real-time information to make informed route and mode choice decisions. Quantifiable benefits resulting from Intelligent Transportation Systems include:

- Reduced vehicle delays
- Reduced accidents
- Improved air quality
- Reduced fuel consumption
- Improved travel times



Other accrued benefits, which are more difficult to quantify, include reduced driver frustration and reduced driver anxiety from having real-time travel information. Additionally, improved efficiency due to coordinated and cooperative agency actions can produce long term savings, particularly in relation to coordinating regional projects and a coordinated regional response to incidents.

Project Background

This section includes example benefits from other projects around the state.

Coordinated Signal Timings

State-of-the-art traffic signal systems, with communication to a central computer and coordinated signal timing plans have proven to produce substantial benefits to the public. Examples from local coordinated signal timing projects in Oregon have produced the following benefits:

- 10- to 40-percent reduction in stops
- 15- to 45-percent reduction in delay
- 5- to 25-percent reduction in travel time
- Up to 15-percent reduction in fuel consumption

Incident Management

The Oregon Department of Transportation, in association with the Oregon State Police, currently operates an incident management program in Region 2 to assist disabled vehicles. The incident management program includes incident response vehicles that patrol the Region 2 roadways to assist motorists and reduce the duration of incidents and reduce the resulting traffic congestion. Based on an evaluation of the program[1], the following benefits have been identified:

- 15-percent reduction in average incident duration
- 35-percent reduction in vehicle-hours incident delay

Traveler Information

The dissemination of real-time traveler information provides travelers the ability to make informed travel choices, which could include changing a route, or selecting an alternate mode of travel. The resulting benefits include:

- 7- to 12-percent reduction in travel time
- Up to 33-percent reduction in emissions

Transit Management

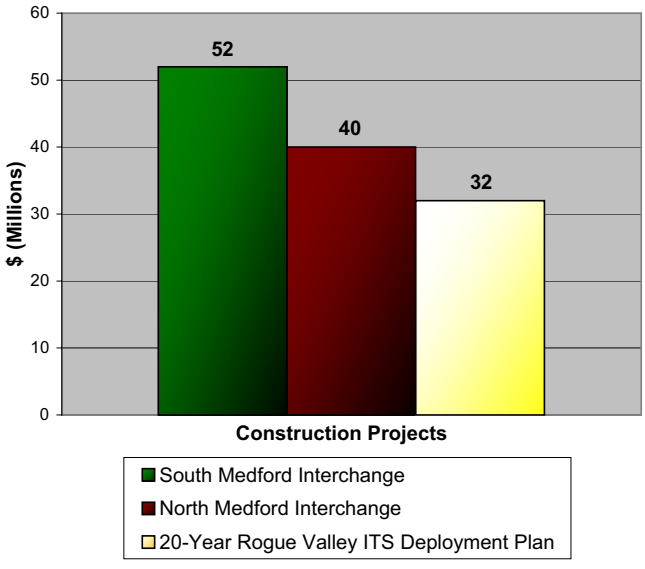
ITS benefits also apply to alternate travel modes such as transit. The use of a global positioning system (GPS) on transit vehicles and devices at traffic signals that allow transit vehicles to proceed through the signal by providing an early green or green extension. A joint TriMet and City of Portland project has experienced the following initial benefits:

- 8- to 10-percent improvement in service reliability
- Up to 10-percent reduction in travel time

Cost Comparison

ITS components can be deployed throughout the Rogue Valley metropolitan area for a fraction of the cost of large construction projects such as the North and South Medford Interchanges.

Project Cost Comparison



[1] *Evaluation of Region 2 Incident Response Program Using Archived Data*, Portland State University, June 30, 2001.

Project Background

Project Approach

Figure 1 illustrates the project approach for the development of an ITS plan for the Rogue Valley metropolitan area. The stakeholder outreach program has played an integral part of developing a cooperative plan that meets regional needs regardless of jurisdiction.

A Steering Committee composed of key stakeholders from regional transportation agencies and the regional 911 centers guided the project with additional input from expanded stakeholders, such as some of the smaller municipalities and a broader sampling of emergency management agencies. Key outreach activities included the following:

- Monthly Steering Committee meetings
- Interviews with key stakeholders to collect transportation user needs information
- Two expanded stakeholder workshops (User Needs Workshop and Deployment Plan Workshop)

Deployment Plan Workshop

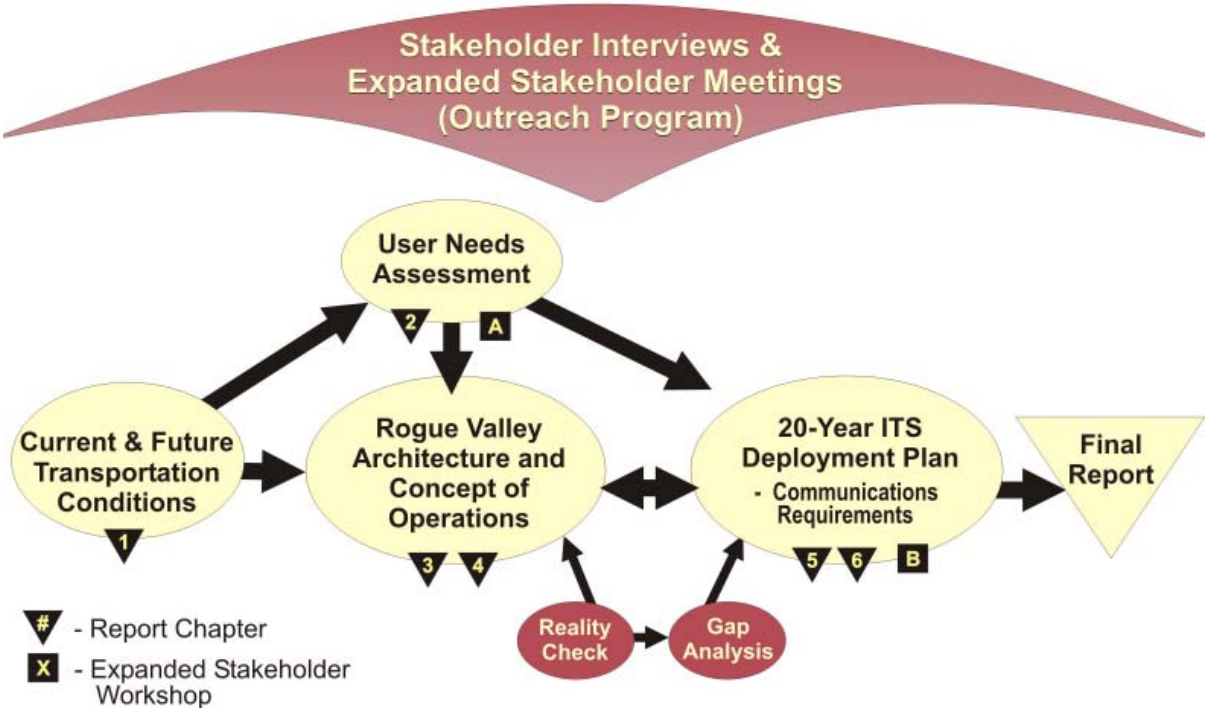
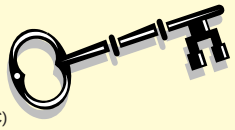


Figure 1. Project Approach

Key Stakeholders

Oregon Department of Transportation (ODOT)
Jackson County: Roads, Parks & Planning
City of Medford: Public Works
Rogue Valley Council of Governments (RVCOG)
Rogue Valley Transportation District (RVTD)
Rogue Valley Central Communications (RVCCOM)
Southern Oregon Regional Communications (SORC)



Expanded Stakeholders

Other Cities (Ashland, Central Point, Eagle Point, Jacksonville, Phoenix, Talent)
Emergency Management Agencies (9 Police, 6 Fire & Rescue, Mercy Flights)
Regional Advisory Councils/Committees
Special Event Organizers
Special Interest Groups (Southern Oregon Visitor's Association)
Large Area Employers

The following sections provide an overview of the results of the plan process for the 20-year Rogue Valley ITS Plan, with particular focus on the following six areas of interest:

- Travel & Traffic Management
- Communications
- Public Transportation Management
- Emergency Management
- Information Management
- Maintenance & Construction Management

Mission, Goals & Objectives

Our Mission Statement is:

Using advanced technologies, the Rogue Valley Metropolitan Area strives to improve the safety and security of the transportation network; improve the movement of goods, people and services; and enhance multi-modal transportation operations through coordinated management techniques, information sharing among agencies and the general public, and partnerships between public and private organizations.

The following project goals and objectives were developed to obtain our mission:

Goal #1: Improve the safety and security of our transportation system.

- Reduce frequency, duration, and effects of incidents.
- Reduce emergency response times.
- Reduce recurrent congestion.
- Coordinate incident/security response with other local and regional agencies.

Goal #2: Improve the efficiency of the transportation system.

- Improve travel time for vehicles, including transit vehicles.
- Improve efficiency for all modes.
- Reduce travel time variability.
- Reduce fuel consumption and environmental impacts.
- Increase vehicle occupancy.
- Improve transit service reliability.
- Improve maintenance and operations efficiencies.

Goal #3: Provide improved traveler information.

- Provide real-time multi-modal transportation system information to travelers.
- Provide information about construction activities.
- Provide incident information.
- Provide real-time road condition and weather information.
- Provide one location where customers can access all regional and local traveler information.

Goal #4: Deploy functional and cost efficient ITS infrastructure.

- Deploy systems that fit in with future improvements.
- Deploy systems with a high benefit-to-cost ratio.
- Deploy systems that maximize the use of existing infrastructure.
- Deploy systems with minimal use of maintenance and operational support.
- Integrate deployments with other local and regional projects.

Goal #5: Integrate regional ITS projects with local and regional partners.

- Build consensus among the Steering Committee members.
- Incorporate Rogue Valley ITS working group as part of the regional planning process.
- Share resources between local and regional agencies.
- Continue to coordinate and integrate projects with other agencies.
- Promote public and private partnerships for ITS deployment, operations, and maintenance.

The National ITS Architecture and the Oregon Statewide ITS Architecture provide the basis for the Rogue Valley ITS Architecture. Figure 2 depicts the physical architecture for the Rogue Valley metropolitan area and includes key stakeholders, existing and desired services (or ITS elements), and the necessary interconnections and information flows required to ensure system compatibility and interoperability.

Providing compatibility amongst jurisdictions will enable the region to fully maximize the use of ITS technologies. For example, an RVTD bus traveling along Highway 99 must be able to communicate with the traffic signals in several cities, including Central Point, Medford, Phoenix, Talent, and Ashland, to allow for transit signal priority. The physical architecture ensures this happens by identifying the connection to the appropriate agencies (ie. RVTD, City of Medford, ODOT) and their equipment (ie. traffic signals and transit vehicles) and the information required to provide the desired service (ie. transit signal priority).

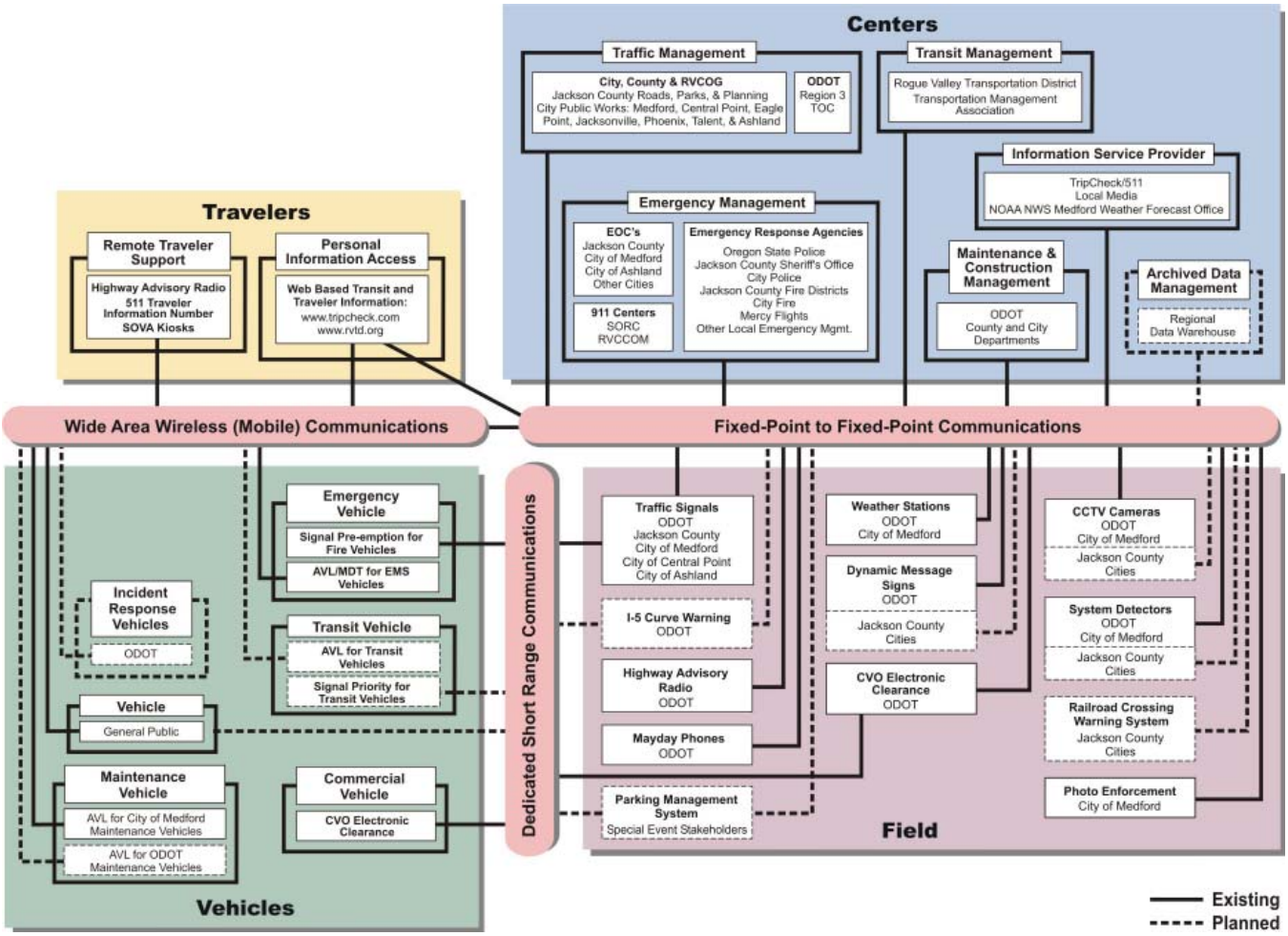


Figure 2. Rogue Valley High-Level Physical Architecture

Concept of Operations

The concept of operations, which supplements the ITS physical architecture, defines the roles and responsibilities of the participating transportation and emergency managagement agencies and identifies information flows between the agencies in the Rogue Valley metropolitan area. The concept of operations defines the responsibilities of the various agencies providing ITS services in the region for activities such as design, construction, integration, planning, operations and maintenance. In addition, the concept of operations defines the level and types of information shared between agencies such as data, video, status, request and control.

ITS Deployment Plan

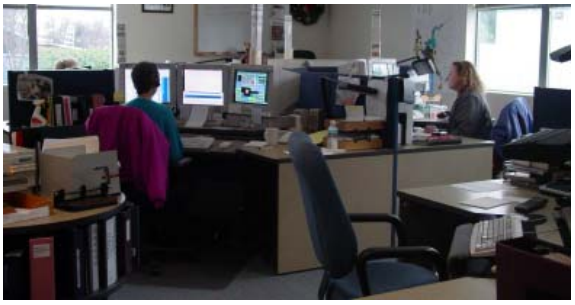
Three time frames define the Rogue Valley ITS Deployment Plan: 0-5 years, 6-10 years, and 11-20 years. Based on stakeholder input and key findings from system evaluations, the projects recommended for implementation in the Rogue Valley metropolitan area have been organized and described by the following program areas:

- Travel & Traffic Management (TM)
- Communications (CO)
- Public Transportation Management (PTM)
- Emergency Management (EM)
- Information Management (IM)
- Maintenance & Construction Management (MC)

Each of these program areas is described briefly in this section and highlights the projects included in the 5-Year Plan. Figure 3 depicts field device locations for the full 20-Year ITS Plan and Table 4 includes a brief description of each project included in the plan. The project numbers used in this table are for reference purposes only and do not indicate any type of priority. Table 5 includes the 20-Year schedule which was determined based on stakeholder input, existing and future corridor operation (i.e. recurrent congestion, bottlenecks, and accident data), relation to planned projects, and technical feasibility.

Travel & Traffic Management

Projects within this program area are focused on improving the safety and efficiency of the existing roadway system by providing tools to better manage the existing infrastructure, to coordinate with regional partners, and to provide traveler information to the public. Table 1 describes the projects included in the 5-Year Plan. The purpose of most of these projects is to improve travel time, to reduce crashes and the effects of crashes, to provide incident response, and to provide more traveler information.



ODOT TOC and OSP Dispatch

Table 1. Capital Costs for Travel & Traffic Management

Traffic Control & Management	Capital Cost
Highway 62 (Install CCTV, system detectors and communications)	$100,000
Highway 99 (Install CCTV's, system detectors and communications)	$480,000
I-5 (Install CCTV's, system detectors, a dynamic message sign and communications)	$860,000
Crater Lake Ave (Install CCTV and communications)	$60,000
Barnett Road (Install CCTV's and communications)	$120,000
Pine St (Install system detectors and communications)	$20,000
Stewart Ave (Install system detectors and communications)	$20,000
Table Rock Rd (Install system detectors and communications)	$60,000
Implement traffic signal coordination at approximately 20 intersections	$80,000
Implement transit signal priority along Highway 62	$275,000
Implement the advanced traffic management system (ATMS) software currently under development by ODOT	N/A
Safety	**Capital Cost**
Install a curve warning system in the Siskiyou Pass	$550,000
Develop and implement an incident management and operations plan for I-5 from Exit 27 to 30 (the viaduct)	$495,000
Traveler Information	**Capital Cost**
Display CCTV images on TripCheck and provide congestion and incident information on TripCheck and 511	$380,000
Develop a link on TripCheck to provide camera images, weather information, and road conditions through the Siskiyou Pass	$110,000
Upgrade the existing Highway Advisory Radio in Ashland and expand the system to include Medford and the Siskiyou Pass	$150,000
Install traveler information kiosks (Airport and Suncrest Rest Area)	$150,000
Systems Integration	**Capital Cost**
Integrate the ODOT TOC with Local Transportation Operations Systems	$205,000
TOTAL:	**$4,115,000**

Communications

The communication system provides the backbone for deployment of projects in the other five program areas by providing a network for exchanging information to and from field devices and stakeholder agencies. The key communication project scheduled for the 5-Year Plan is the documentation of communication standards to ensure standardization and compatibility throughout the region. For the most part, the communication network will be deployed on a project-by-project basis throughout the next 20 years to support the ITS Plan as needed.

Public Transportation Management

Public transportation management technologies address two major aspects of transit operations: (1) transit agency operations and management and (2) transit traveler information systems. The projects in this program area are intended to enhance existing RVTD systems and to improve transit traveler information. Table 2 highlights the 5-Year Plan projects.

Table 2. Capital Costs for Public Transportation Management

Management	Capital Cost
Deploy automated vehicle locators (AVL) on the entire RVTD fleet and install a computer aided dispatch (CAD) system at the dispatch center	$620,000
Traveler Information	**Capital Cost**
Provide ODOT's Regional Trip Planner Project with real-time transit schedule information, which will be accessible on the Internet	$350,000
TOTAL:	**$970,000**

Emergency Management

The main purpose of projects included in this program area is to reduce emergency response times and to integrate emergency management with transportation and transit management. Many emergency management projects included in the ITS Plan are included later in the schedule because they are highly dependent on travel and traffic management projects, but several key projects are included in the 5-Year Plan as indicated in Table 3.

Table 3. Capital Costs for Emergency Management

Management	Capital Cost
Install automated vehicle locators (AVL) on the emergency vehicle fleet and integrate with the mesh network to track vehicles in real time	$450,000
Systems Integration	**Capital Cost**
Provide a two-way information flow between the transportation management systems and the 911 and emergency dispatch centers	$1,350,000
Exchange real-time information (video, audio, data) between regional ambulances and hospitals	$250,000
TOTAL:	**$2,050,000**

SORC 911 Center

Information Management

Collecting, archiving, and managing various types of transportation-related data is a critical part of this ITS Plan. Since much of the data collection is closely tied to projects that deploy field devices and systems to collect data, the two information management projects are included in the 10-Year Plan.

Maintenance & Construction Management

These projects are aimed at improving the safety of motorists and workers in construction zones, improving the efficiency of construction management and control, enhancing construction scheduling, and tracking weather conditions that affect maintenance. During the 5-Year Plan, two additional roadway weather information system (RWIS) sites will be deployed on I-5 in the Siskiyou Pass to help enhance maintenance efforts and provide additional traveler information.

High Priority Projects

The highest priority projects are scheduled for deployment within the first five years. This section summarizes the key high priority projects.

Network Surveillance

The purpose of this project is to provide traveler information for the general public and monitoring capabilities for traffic management, maintenance, and emergency management personnel on key corridors. As part of this project, 13 CCTV cameras will be deployed during the five-year plan.

Traffic Data Collection System

This project's purpose is to better manage the regional roadway network by collecting roadway performance data and to reduce incident response times and improve travel times by providing real-time congestion information. A total of 13 automatic traffic recorders will be deployed during the first five years to support this project.

Curve Warning System

The goal of this project is to deploy a curve warning system on I-5 at Milepost 6.3 in the northbound and southbound directions to warn drivers to reduce their speed prior to entering a sharp horizontal curve. Radar will be used to detect vehicle speeds and dynamic message signs will be used to post warning messages based on vehicular speed.

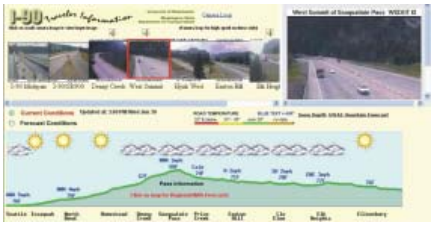
Incident Management and Operations

In order to provide multi-agency traffic-responsive corridor management, to reduce secondary crashes caused by an incident, and to reduce the amount of time normal freeway operations are disrupted when incidents occur, this project will develop and implement an incident management and operations plan for I-5 from Exit 27 to Exit 30 (Medford Viaduct). Field devices may include trailblazer signs and changeable fixed message signs in addition to other planned ITS devices.

Transit Signal Priority

To improve transit travel time reliability on corridors with traffic signals, this project will give priority at traffic signals to buses that are running behind schedule. This project will initially be deployed on RVTD Route 60, which runs along Highway 62.

I-5 Siskiyou Pass Traveler Information



The purpose of this project is to provide a graphical display of real-time and forecasted weather conditions on I-5 over the Siskiyou Pass. This project will be created as a special feature of ODOT's TripCheck website that provides a profile view of the Pass along with camera images and spot weather information.

AVL/CAD Transit Management System

To manage the RVTD transit fleet and to enhance customer service, this project will install automated vehicle location (AVL) equipment on all fixed route RVTD transit vehicles and will also include a computer aided dispatch (CAD) system, which will map the real-time location of transit vehicles and monitor transit fleet functions.

Ambulance-Hospital Information System

This project will utilize the wireless mesh network to provide real-time information (video, audio, and data) between emergency medical technicians in ambulances and physicians at regional hospitals. Although the mesh network is currently only installed in Medford, there are plans to expand this network throughout the region.

Rogue Valley
Intelligent Transportation Systems

EAGLE POINT
HIGHWAY 62
WHITE CITY
KIRTLAND
ANTELOPE
BLACKWELL
TABLE ROCK
FOOTHILL
ROGUE VALLEY
PINE
FRONT
PACIFIC
CENTRAL POINT
BIDDLE
CRATER LAKE
ROSSANLEY
MCANDREWS
HANLEY
MEDFORD
CENTRAL MEDFORD INSET
HIGHWAY 238
5TH
JACKSONVILLE
N PHOENIX
PACIFIC
MAIN
PHOENIX
INTERSTATE 5
TALENT
PACIFIC
HIGHWAY 99
MAIN
INTERSTATE 5
SISKIYOU
ASHLAND
STEINMAN DR
OLD SISKIYOU HWY 273
MT ASHLAND RD
OLD HIGHWAY 99 S
SISKIYOU PASS

HWY 238
MCANDREWS
COURT
BIDDLE
CRATER LAKE
JACKSON
INTERSTATE 5
E JACKSON ST
CENTRAL
MAIN
I-5
E 12TH ST
RIVERSIDE
INTERSTATE 5
STEWART
COLUMBUS
KINGS HWY
GARFIELD
CENTRAL MEDFORD

LEGEND

ITS Devices

Device Phasing:

- Existing
- Proposed 0 - 5 Years
- Proposed 6 - 10 Years
- Proposed 11 - 20 Years

- CCTV Camera
- Mayday Phone
- Trailblazer Sign
- Weather Station
- Traveler Information Kiosk
- Automatic Traffic Recorder
- Parking Management System
- Highway Advisory Radio Transmitter
- Red-light Running Enforcement Camera
- Weigh-in-Motion
- Dynamic Message Sign
- Curve Warning System

- ITS Corridors
- Streets
- UGB & UCB
- RVMPO Boundary

RVMPO
7.20.04

0 1 2 4 6 Miles

Figure 3

ITS DEPLOYMENT PLAN FOR 2004-2024

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Table 4. Deployment Project List (Page 1 of 3)

Project Number & Title	Project Description
Travel & Traffic Management (TM)	
RV-TM-01: Integration Between ODOT Region 3 Transportation Operations Center (TOC) and Local Transportation Operations Systems	Project will determine the functional requirements for systems interfaces to traffic and transit management agencies, emergency management agencies, the ODOT Region 3 TOC, and regional field devices. Once the functional requirements have been determined, the local transportation operations systems will be integrated with the ODOT TOC.
RV-TM-02: Network Surveillance	Provide network surveillance on the key regional corridors.
RV-TM-03: Traffic Data Collection System	Deploy automated traffic data collection systems for corridor management and incident detection on key regional corridors.
RV-TM-04: Dynamic Message Signs	Deploy dynamic message signs at key locations on I-5, Highway 99, and Highway 62.
RV-TM-05: Traffic Signal Coordination	Implement traffic signal coordination and install traffic signal interconnect where needed on key regional arterial corridors.
RV-TM-06: Curve Warning System	Deploy a curve warning system on I-5 in the Siskiyou Pass.
RV-TM-07: Speed Monitoring System	Deploy an automated speed monitoring system with driver feedback signs on Highway 99 and Highway 62.
RV-TM-08: Incident Response Program	Develop a multi-jurisdictional regional incident response program to support emergency management agencies with incident management on regional state, county, and city roadways. This program includes personnel, response vehicles, and dispatch.
RV-TM-09: Incident Management and Operations	This project includes the development of incident management operational plans and the deployment of field devices to manage incidents. The field devices will include CCTV cameras, dynamic message signs, trailblazers, and system detectors to detect incidents, monitor conditions, and post traveler information. Coordinated traffic signal timing plans will also be implemented. The incident management operational plans will include the operational protocol for field devices (i.e. CCTV cameras, DMS, and system detection on mainline and alternate routes), the development of incident signal timing plans on alternate arterial routes, and clearly defined agency roles and responsibilities. The corridors finclude I-5 (Exits 11 to 35), I-5 (Siskiyou Pass), Hwy 62, and Hwy 140.
RV-TM-10: Transit Signal Priority	Give priority at traffic signals only to buses that are behind schedule to support transit operations and schedule adherence. This project includes installing transit priority equipment on the transit fleet as well as upgrading equipment at traffic signals and traffic signal controllers (as needed) along all RVTD transit routes. This project also includes staff time to design and implement the transit signal priority timings.
RV-TM-11: Central Signal System	Upgrade the City of Medford central signal system to provide additional functionality such as transit signal priority, congestion mapping, integrated camera control, and enhanced data collection reporting. This project also includes installing a central signal system for traffic signals owned by ODOT, Jackson County, the City of Central Point, and the City of Ashland. Ensure the system can be integrated with transit systems (i.e. AVL) and emergency management systems (i.e. AVL). Consider sharing the same central signal system with the City of Medford.
RV-TM-12: Advanced Traffic Management System (ATMS) Software	Implement ODOT's ATMS Software in the Rogue Valley metropolitan area. This software will provide functionality to automatically notify the media and other agencies of incidents, support remote camera control and sign control, support congestion mapping, and support travel time reporting.
RV-TM-13: Expand/Upgrade Highway Advisory Radio (HAR)	Expand and upgrade existing highway advisory radio system to cover a greater geographic area and to include more traveler information.
RV-TM-14: Integrate Regional Traveler Information with TripCheck, 511, and Highway Advisory Radio	Develop an integrated system for disseminating and posting traveler information to TripCheck, 511, and HAR. This should include the ability to disseminate information to web-based services such as personal digital assistants (PDA's) and cell phone messaging.

Table 4. Deployment Project List (Page 2 of 3)

Project Number & Title	Project Description
RV-TM-15: Integrate 511 with Northern California	When California expands their 511 system to northern California, integrate the California and Oregon systems so that travelers may access information from both states when they are near the state borders.
RV-TM-16: Traveler Information Television	Develop a dedicated television station for disseminating traveler information, such as camera images from the TripCheck website or congestion/incident maps.
RV-TM-17: Traveler Information Kiosks	Deploy computerized touch-screen kiosks that provide traveler information, including a link to TripCheck at the Airport and at Rest Areas. ODOT plans to deploy a site specific weather forecast kiosk with a link to 511 that provides nearby site conditions at the Suncrest Rest Area near Talent.
RV-TM-18: I-5 Siskiyou Pass Traveler Information	Develop a separate link on TripCheck for the Siskiyou Pass that includes a one-page profile view of I-5 with current and forecasted weather conditions and camera images along the entire length of the pass. Weather information shall be integrated with NOAA.
RV-TM-19: Integrate Rogue Valley International-Medford Airport Traveler Information with ODOT Region 3 TOC	Provide traveler information about Rogue Valley roadways at the airport and provide airport information to travelers via TripCheck and dynamic message signs operated by the TOC.
RV-TM-20: Special Event Management Systems	Project includes the deployment of traffic signal timing plans, portable dynamic message signs, and parking management for the Jackson County Fairgrounds, Oregon Shakespeare Festival, Britt Festival, and other regional special events.
Communication (CO)	
RV-CO-01: Document Communication Design Standards	Document design standards for communications in the following areas to ensure standardization, compatibility, connectivity, and reliability between multiple jurisdictional agencies: conduit construction, minimum number of fibers, network technology, junction boxes, fiber termination panels, fiber connectors, communication hub design, fiber optic testing specification, fiber optic installation specification, and end electronics.
RV-CO-02: Communication Network	Expand the communication network to support additional field devices and connect operations centers to the regional communications network.
Public Transportation Management (PTM)	
RV-PTM-01: Automated Vehicle Location (AVL)/ Computer Aided Dispatch (CAD) Transit Management System	Install an automated vehicle location (AVL) system on the RVTD fleet and install a computer aided dispatch (CAD) system at the RVTD dispatch center. RVTD plans to put 10 new buses, which are designed to accommodate an AVL system, into service in the fall of 2004. AVL should be deployed on these 10 buses, and the rest of the fleet should be outfitted with AVL as vehicles are replaced. Integrate the CAD system with the AVL system so that dispatchers may track the fleet in real-time and monitor on-time performance.
RV-PTM-02: Integrate Real-Time Transit Traveler Information with ODOT Regional Trip Planner Project	Provide ODOT's Regional Trip Planner Project with real-time transit schedule information. Real-time information will be searchable by route and stop location and indicate the amount of time until the next arrival.
RV-PTM-03: Real-Time Customer Information Displays	Deploy real-time dynamic message signs at key locations such as transit centers and bus stops where multiple routes pass through, and at stops with large bus headways.
RV-PTM-04: Online Route Assignment	Develop an online route assignment program accessible by customers on the Internet and personal digital assistants that enables the user to determine the appropriate transit route to take between two locations. The system includes selecting the route based on quickest trip, fewest transfers, or shortest walk.
RV-PTM-05: Automated Passenger Counting (APC)	Install an automated passenger counting (APC) system that electronically records the number of passengers boarding and deboarding at each transit stop as well as the location and the time.
RV-PTM-06: Automated Stop Announcements	Provide automated stop announcements prior to each scheduled stop along a transit route.
RV-PTM-07: Electronic Fare Collection with Smart Cards	Update the electronic fare collection system on the RVTD fleet to include the use of "smart" cards that allow for electronic payment of fares based on fare type (i.e. adult, senior) and zone.

Table 4. Deployment Project List (Page 3 of 3)

Project Number & Title	Project Description
RV-PTM-08: Paratransit Scheduling with Mobile Data Terminals (MDT's)	Install mobile data terminals (MDT's) in paratransit vehicles so that dispatch may provide updated schedule and route information to each paratransit vehicle.
RV-PTM-09: Periodic Transit Fleet Maintenance System Upgrades	As technology evolves, upgrade the existing transit fleet maintenance system to continue the integration between of the on-board system with the vehicle diagnostics system.
RV-PTM-10: Transit Security System Integration of Video Images with RVTD Dispatch	Develop a system to transmit video from buses and the transit station back to RVTD dispatch for real-time surveillance capabilities.
Emergency Management (EM)	
RV-EM-01: Integration Between Traffic/Transit Management Systems and Emergency Management Systems	Provide a two-way information flow (i.e. CCTV camera images, congestion flow map, emergency calls) between transportation management systems and the metropolitan area 911 and emergency dispatch centers.
RV-EM-02: Provide Interface Between Traffic Management Systems and Emergency Operations Centers (EOC's)	Provide an interface between the Regional Virtual TOC or other traffic management systems and each of the regional emergency operations centers to allow access to traffic control devices during emergency situations at the EOC's as well as to share information between agencies. This project includes workstations, monitors, and a communications interface at the EOC's.
RV-EM-03: Traffic Adaptive Emergency Response	Deploy an integrated emergency response system that provides for pre-trip planning, en-route guidance (static route plan), and dynamic route guidance (traffic-adaptive route plan) for emergency vehicles.
RV-EM-04: Provide Real-Time Traffic Information to Mobile Data Terminals	Provide real-time traffic information to mobile data terminals housed in emergency response vehicles. Inventory existing emergency vehicle fleet to determine how many additional mobile data terminals need to be installed and install these as necessary.
RV-EM-05: Emergency Vehicle Fleet Management System	Installation of automated vehicle locators (AVL) on emergency vehicles and dissemination of real-time emergency vehicle locations to dispatchers at the 911 centers for resource allocation.
RV-EM-06: Ambulance-Hospital Information System	Enable the exchange of real-time information (video, audio, and data) between regional ambulances and hospitals through the regional communication network.
Information Management (IM)	
RV-IM-01: Regional Data Management System	Create a data management system for archiving data, collecting real-time data, and accessing data. The system should have geospatial capabilities and data should include at a minimum traffic counts, speed data, accidents (vehicles, pedestrians, and bicycles), traffic enforcement data, incident information, and transit information.
RV-IM-02: Regional Data Standardization	Determine as a region the preferred format for data collection, reporting, and storage for consistency throughout the region.
Maintenance & Construction Management (MC)	
RV-MC-01: Maintenance, Construction, and Special Event Coordination System	Develop an information management system that contains details about regionwide maintenance and construction activities by public agencies, utility companies, and private contractors as well as special event information, including location and event duration.
RV-MC-02: Winter Maintenance Scheduling	Deploy a system that monitors environmental conditions and weather forecasts and uses the information to schedule winter maintenance activities, determine the appropriate snow and ice control response, and track and manage response operations.
RV-MC-03: Roadway Weather Information Systems	Deploy roadway weather information sites that provide temperature and road conditions at Jacksonville Hill, McAndrews Rd on the Hill, and the Siskiyou Pass.
RV-MC-04: Develop Work Zone Management Standards	Develop standards for safety enhancements and management techniques in work zones such as variable speed limits, incident detection and management, lane merge controls, and queue detection with electronic driver feedback signs.

Table 5. Deployment Plan Schedule (Page 1 of 2)

Ref. #	Project Title	Years	5-Year Plan					10-Year Plan					20-Year Plan									
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Travel & Traffic Management																						
RV-TM-01	Integration Between ODOT Region 3 Transportation Operations Center (TOC) and Local Transportation Operations Systems					■	■				■	■				■	■					
RV-TM-02	Network Surveillance		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
RV-TM-03	Traffic Data Collection System		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
RV-TM-04	Dynamic Message Signs		■	■				■	■				■		■		■					
RV-TM-05	Traffic Signal Coordination			■	■	■				■	■	■				■	■	■				■
RV-TM-06	Curve Warning System					■	■															
RV-TM-07	Speed Monitoring System												■	■								
RV-TM-08	Incident Response Program																■	■				
RV-TM-09	Incident Management and Operations				■	■	■			■	■	■			■	■	■			■	■	■
RV-TM-10	Transit Signal Priority		■			■	■			■	■			■	■			■	■			■
RV-TM-11	Central Signal System							■	■						■	■						
RV-TM-12	Advanced Traffic Management System Software				■	■																
RV-TM-13	Expand/Upgrade Highway Advisory Radio (HAR)		■			■	■			■	■			■	■							
RV-TM-14	Integrate Regional Traveler Information with TripCheck, 511, and Highway Advisory Radio		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
RV-TM-15	Integrate 511 with Northern California												■	■								
RV-TM-16	Traveler Information Television										■	■										
RV-TM-17	Traveler Information Kiosks		■	■				■	■				■	■				■	■			
RV-TM-18	I-5 Siskiyou Pass Traveler Information				■	■	■															
RV-TM-19	Integrate Rogue Valley International-Medford Airport Traveler Information with ODOT Region 3 TOC															■	■					
RV-TM-20	Special Event Management Systems												■	■	■			■	■	■		
Communications																						
RV-CO-01	Document Communication Design Standards			■	■																	
RV-CO-02	Communication Network		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

■ Proposed Implementation ■ Currently Funded Projects

Table 5. Deployment Plan Schedule (Page 2 of 2)

Ref. #	Project Title	Years 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		5-Year Plan					10-Year Plan					20-Year Plan									
Public Transportation Management																					
RV-PTM-01	Automated Vehicle Location (AVL)/Computer-Aided Dispatch (CAD) Transit Management System	■	■	■																	
RV-PTM-02	Integrate Transit Traveler Information with ODOT Regional Trip Planner Project				■	■															
RV-PTM-03	Real-Time Customer Information Displays						■	■	■			■	■	■	■			■	■		
RV-PTM-04	Online Route Assignment					■	■														
RV-PTM-05	Automated Passenger Counting (APC)				■	■															
RV-PTM-06	Automated Stop Announcements						■	■													
RV-PTM-07	Electronic Fare Collection with Smart Cards						■	■	■												
RV-PTM-08	Paratransit Scheduling with Mobile Data Terminals (MDT's)																		■	■	■
RV-PTM-09	Periodic Transit Fleet Maintenance System Upgrades						■					■					■				
RV-PTM-10	Transit Security System Integration of Video Images with RVTD Dispatch											■	■	■							
Emergency Management																					
RV-EM-01	Integration Between Traffic/Transit Management Systems and Emergency Management Systems				■	■															
RV-EM-02	Provide Interface Between Traffic Management Systems and Emergency Operations Centers (EOC's)						■	■							■	■					
RV-EM-03	Traffic Adaptive Emergency Response														■	■					
RV-EM-04	Provide Real-Time Traffic Information to Mobile Data Terminals									■	■										
RV-EM-05	Emergency Vehicle Fleet Management System			■	■							■	■								
RV-EM-06	Ambulance-Hospital Information System		■	■						■	■										
Information Management																					
RV-IM-01	Regional Data Management System								■	■											
RV-IM-02	Regional Data Standardization						■	■													
Maintenance & Construction Management																					
RV-MC-01	Maintenance, Construction, and Special Event Coordination System											■	■								
RV-MC-02	Winter Maintenance Scheduling												■	■							
RV-MC-03	Roadway Weather Information Systems (RWIS)			■	■					■	■	■				■	■				
RV-MC-04	Develop Work Zone Management Standards						■	■													

■ Proposed Implementation ■ Currently Funded Projects

Next Steps

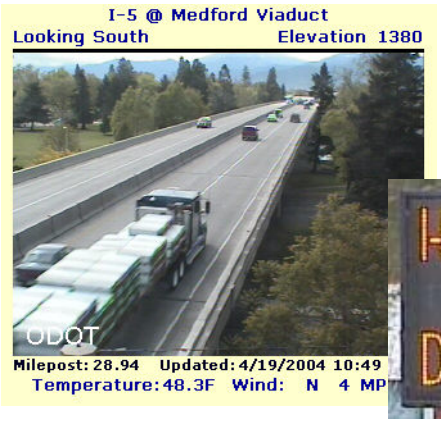
This section outlines the steps to successfully implement the proposed ITS plan for the Rogue Valley metropolitan area over the next 20 years.

Deploy "Early Winner" Projects

Another key to the success of ITS in the Rogue Valley will depend on the deployment of "early winner" projects. The incident management and operations project for I-5 from Exit 27 to 30 (the viaduct) is a potential "early winner" project because it supports regional freeway and arterial management, emergency management, and traveler information. This project includes the deployment of field devices (trailblazer signs, changeable fixed message signs) in conjunction with the network surveillance and traffic data collection system projects.

Incorporate the ITS Plan in the RTP Update Process

The ITS Steering Committee plans to incorporate this ITS Plan in the Regional Transportation Plan (RTP) update that will be completed by April 2005. The ITS devices and communication infrastructure identified in this plan should be installed on corridors concurrently with traditional transportation construction and maintenance projects. This approach will minimize reconstruction, save time and money, and result in the modernization of the regional transportation system. Where applicable, relationships to currently planned regional projects have been identified in the Deployment Plan chapter of the final report. In addition, the data collection, analysis, operational techniques and information sharing developed through the projects in this plan can become key elements of other regional efforts.



Do Not Overlook Future Needs if They Fit With Current Opportunities

The region should pursue a flexible approach to implementing the plan. Opportunities may become present in early years to implement elements of the plan identified for later deployment. These opportunities may be possible due to other funding sources, coordination with roadway construction, coordination with local agency/private initiatives and/or transit priorities. These opportunities should be seized when appropriate.

Define a Revenue Stream

Key stakeholders in the Rogue Valley metropolitan area will need to define a revenue stream for construction, operations and maintenance. This plan provides the basis for the funding and identifies opportunities for regional coordination and cost-sharing. The region must dedicate funding sources to implement each increment of the 20-year plan. In addition to the traditional funding sources, other non-traditional sources for funding such as grants from non-profit agencies should be considered.

The total capital, engineering and annual operations/maintenance costs for the ITS program are provided in Table 6. The Rogue Valley metropolitan area will need an on-going commitment to operations and maintenance of the equipment and software to maximize the benefits of the ITS program. The ITS elements proposed within this program require consistent staffing for effective system operation, as well as requiring trained staff to do routine maintenance.

Table 6. Estimated Capital, Operations, and Maintenance Costs for 20-Year ITS Plan

Implementation Stage	Estimated Implementation Capital Costs	Estimated Annual Operations & Maintenance Costs*
5-Year Plan: 0 - 5 Years	$8,510,000	$265,000
10-Year Plan: 6 - 10 Years	$9,778,000	$366,000
20-Year Plan: 11 - 20 Years	$13,250,000	$460,000
ITS Plan Maintenance	N/A	$100,000
TOTAL	**$31,538,000**	**$1,191,000**

* Annual operations and maintenance costs are per year for the associated stage.

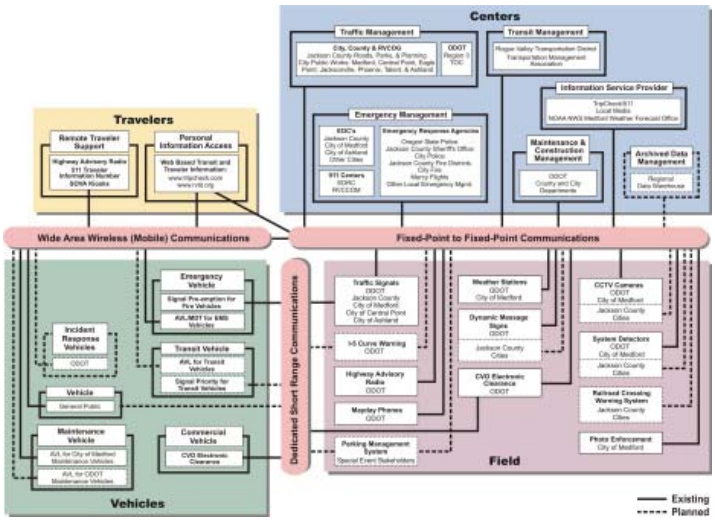
Lead Agency to Guide ITS Plan Implementation and Maintenance

The Rogue Valley Metropolitan Planning Organization (RVMPO) has volunteered to take the lead agency role for ITS plan implementation and maintenance. Key roles that the RVMPO will assume include the following:

- Manage the Steering Committee and hold at least two meetings per year.
- Incorporate the ITS Plan as a separate section of the *Regional Transportation Plan* (*RTP*) update scheduled for April 2005.
- Incorporate ITS projects into regional project prioritization lists.
- Coordinate funding applications for ITS projects.
- Coordinate and track project implementation.
- Maintain the regional architecture, including the Turbo Architecture 3.0 file.
- Arrange public outreach sessions as needed.
- Provide updates to the RVMPO Policy Committee, Technical Advisory Committee (TAC), and Public Advisory Council (PAC) as needed.

Regional Architecture Maintenance

One of the keys to successful ITS plan implementation is the maintenance of the plan and architecture as ITS projects are implemented, as regional ITS needs and services evolve, and as new technologies emerge. The architecture must be maintained per federal requirements and the FHWA recommends updating the regional architecture for the following primary reasons:



- Changes in regional needs
- Addition of new stakeholders
- Changes in scope of services considered
- Changes in the statewide architecture or other architectures in adjoining regions
- Addition or deletion of projects
- Changes in project priority

The architecture maintenance will be led by the RVMPO, who will also update the Turbo Architecture 3.0 file, and the Steering Committee will provide input to any changes. Additionally, the RVMPO will coordinate with the ODOT ITS Unit

Next Steps

so that ODOT can update the statewide architecture accordingly. Updates to the architecture will take place every three years at a minimum in conjunction with updates to the *RTP*. Significant changes to the architecture may be made at any time deemed necessary by the RVMPO and the Steering Committee and changes will be tracked using a change log.

Project Implementation and Conformity

The implementation of ITS projects in the Rogue Valley shall conform with the regional architecture per FHWA requirements. If the final design of an ITS project varies from the regional architecture, then the regional architecture shall be updated as described in this section. The FHWA requires a systems engineering analysis[2] for all ITS projects on a scale commensurate to each project. The systems engineering analysis shall include:

- Identification of portions of the regional ITS architecture being implemented
- Roles and responsibilities of participating agencies
- Definition of functional requirements
- Analysis of alternative system configurations and technology options to meet functional requirements
- Procurement options
- List of applicable ITS standards and testing procedures
- Operations and management procedures and resources

Steering Committee Roles

The Steering Committee, which consists of key stakeholders, helps foster interagency coordination and build consensus throughout the region. The continuing roles of the Steering Committee during the implementation of the ITS plan include the following:

- Attend at least two meetings per year.
- Make decisions regarding project phasing. As opportunities arise (i.e. funding source, priority shift, or concurrent construction), adjust the project phasing as appropriate.
- Help with or coordinate funding applications.
- Help with or coordinate project implementation.
- Develop memoranda of understanding (MOU's) or intergovernmental agreements (IGA's) as required.
- Prepare plans and standards (i.e. incident management plans and standards for communication design, work zones, and data management).
- Review changes to the regional architecture.

[2] Title 23, Code of Federal Regulations (CFR), Highways, Chapter 1: Federal Highway Administration, Department of Transportation, Part 940: Intelligent Transportation System Architecture and Standards.

Glossary of Acronyms

AVL	Automated Vehicle Location
APC	Automated Passenger Counting
ATMS	Advanced Traffic Management System
CAD	Computer Aided Dispatch
CCTV	Closed Circuit Television
CO	Communications
CVO	Commercial Vehicle Operations
DMS	Dynamic Message Sign
EM	Emergency Management
EMS	Emergency Management Services
EOC	Emergency Operations Center
FHWA	Federal Highway Administration
GIS	Geographical Information System
GPS	Global Positioning System
HAR	Highway Advisory Radio
IM	Information Management
ITS	Intelligent Transportation System
MC	Maintenance & Construction Management
MDT	Mobile Data Terminal
N/A	Not Applicable
NOAA	National Oceanic & Atmospheric Administration
NWS	National Weather Service
O&M	Operations and Maintenance
ODOT	Oregon Department of Transportation
PDA	Personal Digital Assistant
PTM	Public Transportation Management
RTP	Regional Transportation Plan
RVCCOM	Rogue Valley Central Communications
RVCOG	Rogue Valley Council of Governments
RVMPO	Rogue Valley Metropolitan Planning Organization
RVTD	Rogue Valley Transportation District
RWIS	Roadway Weather Information System
SORC	Southern Oregon Regional Communications
SOVA	Southern Oregon Visitors Association
TAC	Technical Advisory Committee
TOC	Transportation Operations Center
TM	Travel & Traffic Management
VMT	Vehicle Miles Traveled