PORTLAND/VANCOUVER TO BOISE ITS CORRIDOR STUDY, FINAL REPORT

NOTE TO READER:

THIS IS A LARGE DOCUMENT

Due to its large size, this document has been segmented into multiple files. All files separate from this main document file are accessible from links (blue type) in the table of contents or the body of the document.

L R E P O R T

Portland/Vancouver to Boise ITS Corridor Study

Idaho Transportation Department
Oregon Department of Transportation
Washington State Department of Transportation

In cooperation with
Federal Highway Administration

DOT/FHWA
150292

Kimley-Horn and Associates, Inc.

Sections

Executive Summary

This executive summary presents the final recommendations and a brief project description of the Portland/Vancouver to Boise ITS Corridor Study. The Study was performed by Kimley-Horn and Associates, Inc. and their subconsultants.

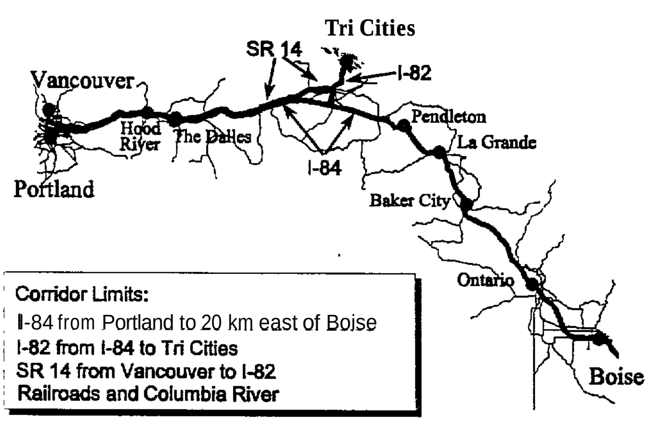
Project Description

This 18 month study, which began in September 1995, was initiated as a joint project between the Idaho Transportation Department, Oregon Department of Transportation, and Washington Department of Transportation, in cooperation with the Federal Highway Administration. A primary purpose of this project was to develop recommendations for the implementation of appropriate ITS technology to address corridor transportation needs over the next 20 years. The study focused on specific applications of Advanced Traffic Management Systems, Advanced Traveler Information Systems, Commercial Vehicle Operations, and Advanced Rural Transportation Systems technologies, with an emphasis on providing implementation guidelines that will facilitate the integration and expansion of future ITS components within the corridor. A secondary purpose was to prepare communications recommendations and system architecture that considers the needs of the three states and the FHWA.

The corridor study included seven project tasks as summarized below:

Work Element 1 -Assess Transportation Needs
This element consisted of gathering data on transportation and traveler information needs and deficiencies in the corridor and identifying the magnitude of the problems.

Work Element 2 - identify Corridor ITS Applications
Work Element 2 involved using the **US** DOT's user services categories to identify which ITS applications had the potential to address corridor needs.



Corridor Limits:
I-84 from Portland to 20 km east of Boise
I-82 from I-84 to Tri Cities
SR 14 from Vancouver to I-82
Railroads and Columbia River

Work Element 3 - Recommend ITS Strategies
This work element identified ITS strategies that had a clear potential to meet corridor needs. Items associated with individual strategies such as benefits. costs, implementation barriers, technology requirements, and funding were addressed.

Work Element 4 - Develop Corridor Plan
This element identified specific projects and programs to be implemented. Short and medium

term projects were developed to allow them to be included in DOT and other funding and construction programs in the three states.

Work Element 5 - Assess ITS Communications Needs
Work Element 5 identified the communication characteristics of various ITS field components and made recommendations for a communication system.

Work Element 6 - Conduct Outreach Effort
This work element contained the project's public involvement and outreach program, including stakeholder interviews, general media releases, targeted media kits, workshops, and stakeholder presentations.

Work Element 7 - Prepare Final Report
Work Element 7 consolidated the results of previous work into a final action plan.

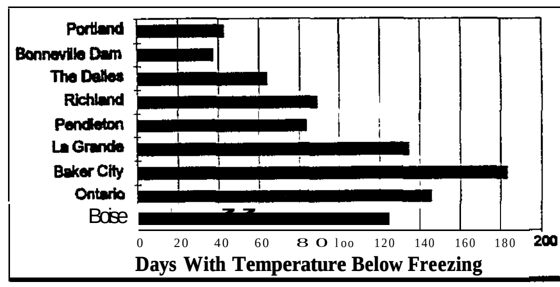
Corridor Synopsis

Much of Interstate 84 between Portland and Boise began as a wagon road for pioneers travelling to the Oregon Territory. Since then, the trail has evolved into a major multimodal transportation and recreational corridor. Wagons have been replaced with cars, trucks, bicycles, buses, ships, trains, and airplanes. Although the transportation mode has changed, the need for improved travel information and safety in the corridor has remained.

Tourism in the corridor is a major industry. The corridor provides access to numerous bicycling, camping, water and snow skiing destinations throughout the Northwest. The Columbia River Gorge is a National Scenic Area and also boasts some of the best wind surfing in the world. Each year, thousands of vacationers travel the roads and visit the unique communities along the way.

Unfortunately, weather conditions interfere with the movement of people and goods. High winds, ice, snow, fog, rain, and even dust storms delay the corridors transportation systems. The Columbia River Gorge, Blue Mountains, and Ladd Canyon are typically the first to be closed due to ice, snow, and wind. Snow often delays freight and passenger rail service as well. In the event of a delay or closure of the roadway, there are few alternatives to using the interstate. Stranded motorists sometimes find it difficult to find food and lodging at cities along the corridor.

In addition to weather-related closures, traffic accidents involving both trucks and automobiles occasionally require the roadway to be closed or limited.

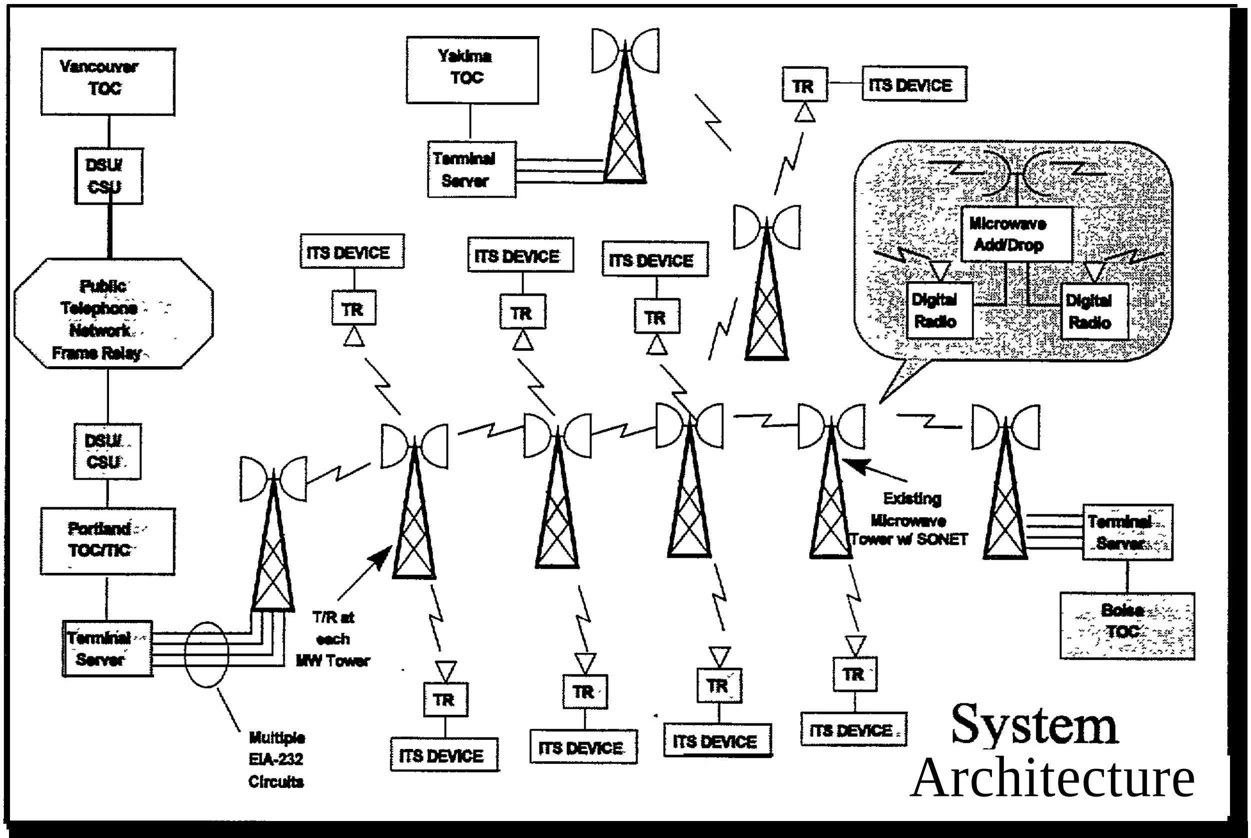


These characteristics, combined with the limited availability of visitor and traveler information, create a unique opportunity to implement innovative transportation technologies along the corridor.

Many ITS field devices already exist along parts of the corridor, including variable message signs, automated weigh stations, and weather sites. Enhancement and interconnection of these facilities with additional system elements can provide a comprehensive intelligent transportation system to improve safety and operation along the corridor. Coordination with state and regional agencies in all three states was initiated during the study process.

> Weather-related *issues found their* way *info nearly every corridor issue. Weather problems ranged* from *ice and snow to winds and dust storms. Many corridor users suggested ITS projects fo provide better, more* advance *information about weather conditions.*

In addition, nearly 50 individuals and organizations were contacted to gather information about transportation problems and ITS opportunities. The interviewees included local government officials, transportation specialists, state transportation departments, tourism advocates, state police, port officials, rail companies, trucking firms, barge companies and other private sector representatives with an interest or involvement in the corridor. This data was used to identify appropriate ITS Technologies.



System Architecture 

An open system architecture was developed for the corridor that represents a mix of technologies matched with deployment recommendations. SONET microwave was recommended as the most cost effective communication between field devices and operation centers; however, partnering with private communication service providers (e.g. right-of-way for fiber) may allow fiber optic with SONET to be a feasible alternative. Leased ISDN/frame relay service is the most cost effective communications option between operation centers and to support coordination between state agencies. Cellular telephones and satellite coverage of the corridor are important to support Mayday, automated vehicle location, and traveler information distribution to vehicles.

Final Project Concepts

The corridor study resulted in short, medium, and long term project recommendations. The following summarizes the recommended deployment for the corridor.

Short Term Deployment (1997-2002)

Short term projects focus on establishing the SONET microwave (or fiber) communications backbone along the corridor and each state's operations center. Specific projects include:

- Project Coordination Committees - A steering committee and a technical advisory committee will be established to ensure standardization of the system and to coordinate the deployment of ITS projects for the corridor. The committees will also be the reviewing body for input on the ITS projects (equipment purchases, communications designs, etc.) that require coordination.

- Coordinated System Design and System Manager - Design an integrated system for the corridor, provide preliminary design and scoping for many of the related Corridor ITS projects, and function as a System Manager during the detailed design and implementation phase. The System Manager is responsible to see that other contractors comply with the overall system requirements including integration into the overall system.

- Communication Integration - implement the communication networks along the corridor as well as link TOCs to existing field devices and information dissemination elements.

- Boise Advanced Traffic Management System Strategic Plan - Evaluate the feasibility and provide recommendations for implementing an ATMS for the Boise area.

- Idaho, Oregon, and Washington TOCs - Establish/upgrade operations centers to receive and disseminate data from field devices. TOCs are linked together, including workstations at state police and DOT field offices in the corridor.

Medium Term Deployment (2003 - 2007)

Medium term projects focus on implementing additional field equipment to meet corridor needs. Projects include the following:

- Road Weather Information System - Deploy new RWIS sites and upgrade existing sites into the communications infrastructure. This includes road and bridge ice sensors, where appropriate, and still frame video.

- Variable Message Signs- Add VMS signs to provide messages for weather, road conditions, rockfall, parking management, and recommended diversions. Integration of the new VMS signs into the communications infrastructure is included.

- Advanced Traveler Information System - Integrate a Traveler information Center into the Portland operations center. This center will coordinate traveler data and disseminate it via Highway Advisory Radio, Highway Advisory Telephone, kiosk, the Internet, and private companies.

- Kiosks - Develop and install traveler information kiosks along the corridor and at the Portland and Boise Airports.

- Rockfall Detection and Warning System - Develop and install two rockfall detection systems on SR 14 and integrate them into the overall communications system infrastructure.

- Tunnel Overheight Detection System - Implement overheight detection systems to alert drivers of large trucks in tunnels along SR 14.

- Bridge Overheight and Overweight Detection System - Implement new overheight and overweight detection systems for bridges at Cascade Locks, Hood River, and The Dalles.

- Port of Entry Upgrade - Upgrade the Washington port of entry (I-82 MP 121) with mainline pre-clearance, overheight detectors, automatic classification, VMS, database management to streamline truck processing and to make the port of entry compatible with the Oregon and Idaho port of entries.

- Multnomah Falls Parking Management System - Develop a system to manage parking conditions at Multnomah Falls and alert travelers of parking availability at the falls via VMS, HAR, and kiosks.

Lona Term Deployment (2008-2017)

Specific projects were not identified for long term deployment; however, the corridor study identified additional systems that may be applicable to the corridor as technology develops.

Deployment Costs

A number of ITS related projects have already been deployed along the corridor. These field devices will be used to form the basic ITS infrastructure. Future projects will build upon the capabilities of related projects and infrastructure. The following is a budgetary estimate for each state to implement the 20 year strategic corridor plan. The communications infrastructure costs are based on an assumed microwave linkage between field devices and the operations centers.

Idaho	$3.6 Million
Oregon	$16.5 Million
Washington	$13.6 Million
Corridor-Wide Projects	$4.7 Million
Total	$38.4 Million