OREGON TRANSPORTATION PLAN UPDATE
Technology in Transportation

Table of Contents

ITS BENEFITS F-1
Traveler Information (Pre-trip and En-route) F-2
Traveler Safety F-3
Traffic and Incident Management F-3
Maintenance (Efficiency) F-5
Transportation Security F-5
Public Transportation F-6
Commercial Vehicle Operations and Safety F-7

OTHER ITS DEVELOPMENT AREAS F-7
In-Vehicle Technologies F-7
Other Modes of Transportation F-8
Related ITS Benefits and Outcomes F-9

TRENDS IN ITS F-10
Customer Service and Operations F-10
Continued Public Sector Involvement F-11
Technology Integration F-11
Increased Vehicle and Highway Interaction F-11
System Applications F-11
Traveler Safety and Security F-11

TECHNOLOGY IN THE CURRENT OREGON TRANSPORTATION PLAN F-12
Current OTP Policies and Actions Related to Technology F-12

TECHNOLOGY IN THE CURRENT OREGON HIGHWAY PLAN F-14
Oregon Highway Plan and Actions Related to Technology F-15

RECOMMENDATIONS FOR THE OREGON TRANSPORTATION PLAN UPDATE F-16

OREGON TRANSPORTATION PLAN UPDATE
Background Paper

Technology in Transportation

With the growing demands placed on Oregon's transportation infrastructure and limited financial resources, new methods must be explored to meet the transportation needs of the state both today and in the future. Intelligent Transportation Systems (ITS) technology provides a significant tool for increasing the efficiency and safety of transportation in the state.

The foundation of ITS applications is based on environmental and transportation sensors, effective communication, computer software and information processing hardware. ITS uses a wide range of advanced technologies and applications to improve transportation safety, provide travel information to system users and more effectively manage the transportation system. The Oregon ITS Strategic Plan: 1997–2017 states that the goals of implementing ITS in Oregon are to:

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

The Oregon Transportation Plan (OTP) update should re-evaluate existing policies relating to technology in order to fully take advantage of the possibilities and benefits that ITS can provide.

ITS Benefits

While many ITS projects provide multiple benefits to the transportation system, in general, ITS programs can be classed into major benefit categories for closer evaluation. Benefit categories defined in this discussion are traveler information (pre-trip and en-route), traveler safety, traffic and incident management, maintenance (efficiency), transportation security, public transportation and commercial vehicle operations and safety. Specific projects from these benefit areas can be integrated in order to achieve higher efficiency goals of system management and promote jurisdictional partnerships which are key to the successful development and operation of many ITS applications.

Traveler Information (Pre-trip and En-route)

Traveler information services are an expanding area of ITS applications that strive to deliver accurate information to users of the transportation system. Successful implementation and operation of traveler information services rely on the quality of the data obtained through system monitoring. A primary example of a travel information service is ODOT's award-winning TripCheck.com web site. TripCheck.com provides a platform for travelers to check traffic cameras that show current traffic volumes and conditions, monitor construction activities, assess incident reports and maps, read weather forecasts, as well as link to other sources of traveler information, including multimodal services. ODOT is currently working on a Regional Trip Planner project in conjunction with Washington State that will provide an itinerary planner with schedules, fares and travel information for public transportation users. This project will encourage mobility and accessibility by easing barriers for trip planning among different modes, services and locations. Future projects including a real-time congestion map for the Portland Metro area, the incorporation of multi-agency data and services and the increased ability to deliver information to wireless devices will further expand the capabilities of TripCheck.com to meet the growing needs of site users and the traveling public.

The new, nationwide 511 dialing code for travel information services began operating in Oregon in late 2003. The 511 program seeks to simplify the process of accessing travel information by providing a consistent, one-number system across the country. The 511 traveler information phone network will compliment TripCheck.com, obtaining much of the information through the same data sources and providing similar information across Oregon. 511 will be an important en-route tool for traveler information, while at this point TripCheck.com remains primarily a pre-trip information tool. ODOT will make improvements and upgrades to its existing traveler information phone system for transfer to the new dialing code. The new system will have the ability to search travel information by city or region rather than route number only. The 511 system will provide the opportunity for the future addition of local road condition reports and transit information.

Variable message signs (VMS), another source of traveler information, can quickly be updated with messages warning motorists of conditions ahead. VMS have been installed along freeways and near major interchanges in the Portland area. By providing timely travel information, VMS allow motorists to make informed decisions about travel routes and potential alternatives while en-route to their destinations.

The Frontier Travel Time and Delay Estimation Project involves pooled resources from eight western states to study the effectiveness of ITS applications in rural areas. ODOT has installed and is testing a Travel Time / Delay Estimation system to monitor travel on a 34-mile rural route with a goal of reporting current average travel speeds along important corridors. Rural areas do not usually face recurring commuting congestion; however, during holidays and special events congestion may be significant, and often there are few alternative routes available. Many of these highways are also critical freight routes that provide a valuable service to the freight system and economy. This project

may lead to more widely available and accurate traveler information in rural areas, increased travel reliability and more effective management of rural transportation systems.

Traveler Safety

A primary concern and responsibility of all transportation operations is safety. ITS can improve traveler safety by providing highway cameras to monitor road conditions, utilizing accurate weather monitoring stations, using variable message signs that can easily be changed and updated to reflect current travel conditions and establishing crash prevention systems. Information provided by these sources is used to warn travelers of potentially hazardous conditions in advance of their trip and en-route to their destinations.

In Europe, variable speed limit signs are used in many locations to adjust traffic speeds to reflect current levels of congestion and increase safety on the highway. In Oregon, variable speed limit signs are initially being considered near construction zones to more accurately reflect the current work status of the project. The variable signs can lower posted traffic speeds when work is underway and raise speeds back to higher levels when it is safe to do so. Motorists will be more likely to respect construction zone warning signs and posted speed limits when the signs are more accurate and responsive.

New types of lighting systems and reflective markings or signs have been tested to increase safety for all users of the transportation system. Lighted lane markings can make it easier for drivers to interpret highway features in degraded driving conditions. Other technologies focus on helping pedestrians and bicyclists safely interact with the highway system. Lighted or highly reflective road crossings and signs are designed to warn motorists of the presence of bicyclists and pedestrians on the roadway.

A roadside advanced curve warning system is being deployed at the Myrtle Creek curves on Interstate 5 to assess vehicle speeds and, if needed, warn motorists to reduce speed to avoid vehicle roll-over accidents along the highway. Similar projects, many of which are geared toward commercial and over-sized vehicles, have been constructed at selected highway locations in other parts of the state. In addition, several weather warning systems have been deployed throughout the state to monitor weather related conditions (e.g. high wind or high water) and warn motorists of hazardous driving conditions.

Traffic and Incident Management

Traffic and incident management is a major concern in the current ITS landscape in Oregon. Associated projects are primarily focused on alleviating traffic problems and using management techniques to reduce traffic congestion in urban areas. Urban traffic management systems monitor traffic flow, quickly detect travel problems and seek to efficiently manage the overall transportation system.

A Transportation Operations Center (TOC), or a Traffic Management Operations Center (TMOC) as is used in the Portland Metro area, is a central component of this urban traffic management. Operation centers use the information obtained from system monitoring techniques such as traffic cameras, pavement sensors (loop detectors), Automated Vehicle Location (AVL) systems installed on transit vehicles and ODOT incident response vehicles patrolling area roadways to assess the performance of the system and quickly identify traffic trouble spots. Operation centers coordinate with ODOT maintenance crews, area jurisdictions and appropriate emergency service providers to jointly manage and quickly respond to incidents and traffic disruptions.

The Portland Metro area is currently operating an Advanced Transportation Management System (ATMS) to improve the efficiency of existing roadways and services. The ATMS, adopted from the Georgia Department of Transportation, is an integrated software package that can analyze traffic incident points throughout the system and bring up specific response plans for that area. The ATMS integrates ODOT's management of area freeways and major arterials with other agencies' systems, including traffic signals and ramp meters. By providing system integration and management tools, the ATMS helps transportation officials make real-time decisions that reduce travel time, increase operational efficiency, improve incident management and reduce secondary crashes.

Ramp metering and traffic signal coordination can be used to physically manage access and flow onto area freeways and roadways to reduce traffic congestion. By controlling the entry of vehicles onto heavily traveled freeways, ramp meters have proven to significantly reduce accidents and keep freeway traffic moving at higher speeds. Coordinated signal systems allow traffic to efficiently travel through a transportation corridor, and traffic adaptive signal systems allow for immediate changes to signal timing to match current traffic conditions. Changing the signal timing as part of an integrated freeway and arterial system can allow vehicles to navigate smoothly around an incident or congested area.

An important component of ODOT's traffic management program is effective incident response and incident management capabilities. Reducing incident response times can save the lives of accident victims, increase the safety of other roadway users and reduce the disruption to traffic flow caused by the incident. The 2001 Urban Mobility Study of 68 metropolitan areas shows that incidents on the highways cause 54 percent of peak period congestion.[1] Data for urban freeways show that for every minute a lane is closed, four to five minutes of traffic back up can be expected.[2] A 15-minute closure can easily lead to a one-hour delay under many traffic conditions. The primary operational goal of incident management is to keep accidents from reducing capacity and restore capacity of the system as quickly as possible. This can significantly reduce the severity of congestion and limit the number of additional accidents caused by traffic back-ups. ODOT's Corridor Management Team, or COMET, trucks keep traffic moving along major

[1] Texas Transportation Institute, *2001 Urban Mobility Study*, May 2001, Table A-6.
[2] Anne P. Canby, "Managing the Urban Transportation System: The Need for a New Operating Paradigm," *Federal Highway Administration National Dialogue on Operations*, August 2001, p. 3.

highways by providing incident prevention, motorist assistance and on-scene, incident management. COMET trucks are heavily employed in the Portland Metro area, but similar programs are currently used in areas of ODOT Region 2, covering much of the Willamette Valley and the Northern Oregon Coast, and ODOT Region 4 in Central Oregon.

ODOT is currently working on a Transportation Operations Center software project to expand the Advanced Transportation Management System on a statewide level. This software will be an integrated package of incident response plans used to mitigate travel problems along specific points in the system. For example, if an accident closes Interstate 5 near the Interstate 205 interchange, an automated response plan for that particular situation would deploy to mitigate the disruption in service. This response plan may coordinate detour routes along the highway system, adjust signal timing of ramp meters and area roadways, enact the proper jurisdictional and emergency management response to meet the specifics of the situation and employ other system management techniques to limit traffic disruption. This extensive project will take time and a great deal of effort to be fully implemented, but it should prove to be a key component of system management in Oregon transportation.

In another project designed to increase the effectiveness of incident management, Intel is working with area 911 centers on an application to facilitate sharing of incident information. This project will enable the exchange of incident data between different computer and communications systems and create an automated response to emergency situations encountered throughout the region.

Maintenance (Efficiency)

ITS can provide increased efficiency in ODOT maintenance operations, particularly in rural areas, that directly translates to lower operating and maintenance costs throughout the department.

Newly automated warning signs allow ODOT crews to notify motorists of potentially hazardous driving conditions without making the often-lengthy trip to manually post signs at the scene of the hazard. Weather warning systems that automatically monitor weather-related conditions (e.g. high wind and high water) also free ODOT crews from manually monitoring these conditions. ODOT also uses Road Weather Information Systems (RWIS) that collect, model and transmit weather information to maintenance crews to allow them to make efficient decisions in the deployment of materials and staff. By more efficiently utilizing limited resources, ODOT can respond to a greater number of problem areas and keep the system functioning at a high level.

Transportation Security

The events of September 11, 2001 have raised the awareness of potential threats throughout the world. Transportation serves not only as a potential target for terrorists acts, but it is also critical component to the successful evacuation of people from the site

of an emergency and a key to the recovery of the area damaged in the incident. ITS has an important role in improving security measures throughout the transportation infrastructure and services. Enhanced surveillance technologies can provide an effective method for monitoring security of critical transportation features and operations. Electronic-seals designed to determine if a container has been tampered with and improved cargo tracking systems, including GPS technologies, provide added security to the shipping process. Expanded x-ray screening systems located a key points along transportation routes and infrastructure can provide an important tool for enhanced security measures. Increased coordination among jurisdictions and emergency management agencies, made possible by ITS-related system coordination projects, will improve the level of security throughout the transportation system and improve the ability to respond to emergencies. These partnerships produce emergency response plans for a variety of incidents to better serve the public in times of need.

Public Transportation

ITS for public transportation seeks to increase the accessibility and improve the reliability of public transit. One aspect of this program has already been discussed in the context of ODOT's Regional Trip Planner project. Transit agencies seek to provide comprehensive, high quality and reliable information to public transportation users. This timely information allows customers to make informed decisions and adapt travel plans accordingly. Other public transit ITS applications increase the reliability of transit schedules, in turn, increasing the user's confidence in the system.

In Portland, TriMet has equipped its entire fleet of 750 buses with Automated Vehicle Location (AVL) technology in order to track traffic flow, identify roadway incidents and provide a more efficient, reliable service to customers. AVL technologies relay information to the dispatch center where actions can be taken to keep vehicles on schedule. Schedule times and route information are also provided to transit riders so that they can monitor the progress and estimated arrival time of their upcoming bus. A related ITS application gives a bus priority at traffic lights and intersections when the bus is behind schedule in an effort to provide reliable transit operations. Using these applications and computer aided scheduling and dispatching allows TriMet to improve system reliability, increase on-time performance, more efficiently utilize fleet resources and expand services.

The electronic payment of transit fares using credit and debit cards provides consumers with new options for accessing public transportation. Oregon Trail Cards, which make cash and food stamps electronically available to low income and other residents on public assistance, can provide a resource for travel funds for many low income Oregonians. The Department of Human Services is working closely with ODOT and other stakeholders in the development of the Regional Trip Planner project, which will evaluate smart card implementation in future releases of the project.

In both urban and rural areas, transit providers use ITS applications to manage their schedule and stop information. Demand responsive transit providers use route selecting

software to optimize their travel services. Some of these applications use Geographic Information System (GIS) mapping capabilities to spatially analyze specific features of the transit system. Even relatively small transit systems have been able to use their vehicles more efficiently and provide more rides to the community while utilizing the same number of vehicles as a result of these applications.

Commercial Vehicle Operations and Safety

ITS programs seek to improve the safety and efficiency of commercial vehicle operations. ODOT's Greenlight program electronically verifies safety and weight information of commercial vehicles from roadside locations while the vehicles are traveling at highway speeds. By being weighed in motion, trucks can bypass weigh stations saving time and increasing the efficiency of freight movement. Oregon E-Government systems provide a web-based platform for trucking related business applications. The ODOT Motor Carrier Transportation Division has made electronic credentialing, a method of paying for operating credentials on-line, a top priority for trucking services at the department.

Another associated need of preclearance applications is having compatible computer systems and equipment among different jurisdictions. Interoperability agreements between multiple jurisdictions provide a means to electronically share trucking information and build compatible systems for the electronic screening of truck traffic. In turn, these agreements allow truckers to utilize and enjoy the same type of electronic screening systems throughout different states rather than needing separate equipment and familiarity with different systems to operate effectively in each area.

Many of the ITS programs that focus on improving safety for travelers consider the safety of commercial vehicle operations as well. Similar to the advanced curve warning system installed at the Myrtle Creek curves on Interstate 5, ODOT has installed a downhill speed warning system on Emigrant Hill located on Interstate 84 east of Pendleton. This system assists commercial vehicles to select the appropriate speed for safely navigating the steep downgrade. ODOT has also implemented an overheight vehicle warning system on the Harrisburg Bridge along State Route 99E to avoid collisions with the bridge. Similar projects around the state continue to improve the safety of commercial vehicle operations to the benefit of all roadway users.

Other ITS Development Areas

In-Vehicle Technologies

ITS also encompasses a growing field of in-vehicle technologies with a wide range of applications. There is a considerable effort being made in the automotive industry to bring ITS to the consumer. Telematic systems, which are advanced wireless and computer technologies for automotive use, are becoming more prominent in newer

automobiles. In-vehicle systems such as OnStar® and Global Positioning System (GPS) navigational devices are using advanced technologies to bring increased options, comfort and safety to vehicle owners. OnStar® provides customers with driving directions, roadside assistance, stolen vehicle tracking and other customer services. GPS navigational systems can provide turn by turn directions, location maps and related features to equipped vehicles.

Microsoft® has developed the "Connected Car" concept, which sees the car as a seamless, mobile platform for computer applications. The "Connected Car" systems include navigational directions, hands-free cell phone use, wireless compatibility with mobile devices and the ability to perform many computer applications from the vehicle.

The United States Department of Transportation's Intelligent Vehicle Initiative (IVI) seeks to reduce crashes by implementing technologies that reduce many mistakes made by drivers. Technologies promoted and researched by IVI include collision warning systems, vision enhancement tools and vehicle stability features. In conjunction with this goal, IVI seeks to prevent in-vehicle technologies from becoming a distraction to drivers. In-vehicle distractions are a significant cause of incidents today and a growing concern as telematics become more widely used. IVI is not limited to passenger vehicles in scope or focus. The transit IVI program seeks to reduce imminent crash situations in the transit environment and assist bus operators in degraded driving conditions. Other IVI programs have produced a number of developments to increase the safety of commercial vehicle operations.

Other Modes of Transportation

The highway and transit systems are not the only modes of transportation in which advanced technologies are being integrated to achieve higher efficiency and operational levels. ODOT is currently working with Amtrak to use Global Positioning System (GPS) technologies to implement a real-time train tracking system and traveler information network. GPS units installed on Amtrak Cascade trains broadcast location and speed information back to a centralized computer server to create a system that provides real-time train schedule reports and announcements to passengers waiting for trains at stations and updates status reports on Amtrak's Internet site. This system also gives Amtrak the ability to make train disruption and status announcements at unstaffed stations and after hours at staffed stations along passenger routes.

Safety is also a major priority across the rail system. New technologies are enhancing existing rail crossing safety infrastructure to benefit not only rail interests, but all travelers that may interact with the rail system. With much of the rail system already interconnected to traffic signal systems, the industry is looking toward new ways of efficiently interacting with non-rail travelers. Variable message signs are being explored to notify travelers of impending road closures or roadblocks due to train activities. Other signage will warn pedestrians and vehicles of approaching trains or in many cases notify them of a second train coming that they may not expect.

In aviation where advanced technologies are already dominant features, transportation officials are looking into new ways of providing convenient mobility options for passengers and freight. NASA has launched the first step of its Small Aircraft Transportation System (SATS) concept with the goal of reducing intercity travel time by more predominately using general aviation aircraft. This program seeks to create more efficient, more affordable, safer and more easily operated small aircraft that utilize the system of general aviation airports around the country. SATS aircraft will incorporate new technologies such as advanced auto-pilot, severe weather notification and avoidance systems, de-icing applications and navigation systems that make flying more in tune with operating an automobile. This effort seeks to create a general aviation system that is more widely available to the traveling public.

Related ITS Benefits and Outcomes

Many ITS applications provide a high benefit to the system with relatively low initial or operational costs compared with traditional construction solutions. Urban traffic management systems have benefit to cost ratios typically 10:1 or more, a number usually not equaled in traditional capacity projects.[3] ODOT's Traffic Section reports that many national studies on traffic signals and traffic signal systems have indicated benefit to cost ratios between 10:1 and 20:1 when computed for road users for the types of improvements included in statewide traffic projects. Los Angeles reports that advanced traffic control systems have reduced travel time by 18 percent and resulted in a 44 percent reduction in travel delay; Albuquerque, New Mexico's computer-aided dispatching system has increased ambulance service operating efficiency by 10 to 15 percent; and national surveys indicate that ramp metering shows a reduction in crashes ranging from 15 to 50 percent. [4] High benefit to cost ratios and examples of successful project results make ITS an attractive alternative to more costly transportation applications.

One of the most important outcomes of ITS investments is the increased level of cooperation among jurisdictions and service providers. The Transportation Portland Project, or TransPort, is a good example of these relationships. TransPort incorporates many different ITS benefit areas and partnerships into an overall project dedicated to helping relieve traffic congestion and better manage the transportation system in the Portland area. ODOT has teamed with the City of Portland, TriMet, Metro and other local jurisdictions to develop and implement this project. TransPort's three components, traffic management, incident response and traveler information, are all program areas discussed in this document. The TransPort project uses ODOT's Portland area Traffic Management Operations Center to coordinate system monitoring activities, dispatch COMET-incident response vehicles, communicate with emergency service providers and disseminate information among variable message signs, web pages, media outlets and other traveler information services.

[3] Lockwood, "Description of Transportation Systems Operations and Management", p. 3.
[4] Canby, p. 13.

Another interjurisdictional ITS project underway at ODOT is the Rural California-Oregon Advanced Transportation System (COATS). COATS is a bi-state partnership with the California Department of Transportation and 20 other stakeholders from the two states that covers much of rural Southern Oregon and Northern California. Other program members include tourism agencies, counties, state police and national forests. The main goal of this project is to improve the safety and efficiency of rural travel in the region by sharing critical information among jurisdictions and motorists. The project has developed an ITS architecture and strategic deployment plan for the region that identifies rural ITS needs over a wide area of the two states. The COATS Showcase is the demonstration portion of the COATS project and is currently moving ahead with many of the ITS application strategies identified and developed under the deployment plan.

ODOT is also working to increase the use of ITS in solving transportation issues in metropolitan areas with the development of ITS Operations and Deployment Plans for each metropolitan planning organization (MPO). These deployment plans, which both rely on and significantly benefit partnerships among agencies, develop the necessary ITS architecture for each MPO.

ODOT is creating a web site to post the details and results of various ITS projects that are currently underway or have already been tested throughout the state. The Benefits of ITS in Oregon web site will introduce jurisdictions and transportation professionals to ITS projects currently in use and help them to assess similar projects for their area.

Trends In ITS

ITS is a dynamic, fast-paced field that is being integrated into transportation applications around the world. Several prominent trends in transportation are defining ITS roles for the future.

Customer Service and Operations

The American Association of State Highway and Transportation Officials (AASHTO), the Federal Highway Administration (FHWA) and the latest surface transportation reauthorization proposal are all moving toward a stronger focus on operations, rather than focusing solely on construction solutions for today's transportation issues. There is an increased focus on customers and customer service throughout the field of transportation. This new focus on customer service includes providing consistent travel times, reliable transit schedules and accurate information to travelers with an emphasis on real-time and en-route capabilities. ITS provides many of the tools needed to improve transportation operations and benefit customer service needs throughout all modes of transportation.

Continued Public Sector Involvement

Trends indicate that the public sector must continue to have a large role in ITS development. This is especially true with travel information services. Private companies have not been successful providing these services without public assistance. Systems users feel they can, and should, be able to get this type of information for free via Internet, television and radio services and have not been willing to pay to obtain travel information.

Technology Integration

There is a trend toward the convergence of wireless applications and services that have primarily been provided by separate equipment such as cell phones, meeting organizers, navigation systems and internet connections. New technologies have the capability to integrate many of these applications into one device. These devices provide travelers with the capability to conveniently receive and access a large amount of information at any time or location. These new technologies provide another opportunity for transportation officials to deliver in-vehicle and en-route travel information to system users who can then make informed and timely travel decisions.

Increased Vehicle and Highway Interaction

There is an increased focus on vehicle and highway interaction throughout the transportation system, primarily through the development of new technologies that enable this cooperation. Applications will include more electronic signing, Geographic Information Systems (GIS) for vehicle location and navigation systems and in-vehicle warning systems that assess close proximity to curbs, upcoming speed zones and unintended lane departures. Infrastructure providers must determine what roadside features should be developed and installed in order to successfully interact with new vehicle technologies and take advantage of the opportunities this relationship provides.

System Applications

ITS development is expanding the "one system" concept of transportation management. ITS allows jurisdictions to treat modes and regions as an interconnected system of transportation modes and infrastructure working together to meet the mobility needs of society. By creating an integrated transportation system with system management techniques such as controlled ramp metering, linked traffic signals, coordinated incident response capabilities and cooperation among area jurisdictions, efficiency can be improved on a systemwide level with far reaching benefits from public investments.

Traveler Safety and Security

A large part of ITS programs will continue to focus on enhancing traveler safety and increasing security of the transportation system. By increasing in-vehicle safety systems, creating a safe transportation infrastructure, utilizing new security technologies and

developing a coordinated response to accidents and emergency situations, ITS can lead the way in creating a safer environment for the traveling public.

Technology in the Current Oregon Transportation Plan

The Oregon Transportation Plan recognizes the important role that technology will play in the future of transportation in the state. The current OTP envisions a change in how business is conducted to incorporate advanced communication technologies, advanced vehicle safety features, traffic management devices and electronic payment applications. The OTP also recognizes the importance of a strong partnership between the public and private sectors. The OTP identifies this partnership as one that promotes research and development of new technologies and promotes the transfer of these applications among all sectors.

Current OTP Policies and Actions Related to Technology

Policy 4H – Research and Technology Transfer
It is the policy of the State of Oregon to promote the development of innovative management practices, technologies and regulatory techniques and safety measures that will further implementation of the Oregon Transportation Plan and lead to new approaches to meeting mobility needs.

> ***Action 4H.1***
> *Form a partnership with Oregon and/or Pacific Northwest universities and private industry to promote transportation research.*
>
> ***Action 4H.2***
> *Broaden the Oregon Department of Transportation's research responsibilities to include research for all modes.*
>
> ***Action 4H.3***
> *Prepare and implement a transportation research agenda for the State of Oregon which includes analysis of the relative costs of implementation measures put forth in this plan.*
>
> ***Action 4H.4***
> *Promote the transfer of emerging transportation technologies and planning and management practices to state, regional and local governments and the private sector. Support the Technology Transfer Center.*
>
> ***Action 4H.5***
> *Establish a demonstration program to encourage alternatives to the use of the automobile.*

Policy 1G – Safety
It is the policy of the State of Oregon to improve continually the safety of all facets of statewide transportation for system users including operators, passengers, pedestrians, recipients of goods and services and property owners.

Action 1G.4
Improve the safety in design, construction and maintenance of new and existing systems and facilities for the users and benefactors including the use of techniques to reduce conflicts between modes using the same facility or corridor. Target resources to dangerous routes and locations in cooperation with local and other state agencies.

Action 1G.5
Improve the delivery of emergency medical services to transportation-related accidents.

Action 1G.6
Increase interagency cooperation among federal, state and local governments and private enterprises in order to implement more effective community-based safety programs.

Action 1G.10
Promote high safety standards for trucks and truck operators.

- *Work with national transportation organizations to accurately determine the safety implications of alternative truck sizes, weights and configurations.*
- *Expand the truck inspection program and have strong sanctions for consistent violators of trucking regulations. Continue to develop and institute a mobile enforcement plan to provide more effective weight enforcement utilizing weigh-in-motion, automatic vehicle identification and other Intelligent Vehicle Highway System technologies.*
- *Take action to minimize conflicts between trucks, automobiles and recreational vehicles.*

Policy 4G – Management Practices
It is the policy of the State of Oregon to manage effectively existing transportation infrastructure and services before adding new facilities.

Action 4G.3
Use demand management and other transportation systems operation techniques that reduce peak period single occupant automobile travel, that spread traffic volumes away from the peak period and that improve traffic flow. Such techniques include HOV (high occupancy vehicle) lanes with express transit service, carpools, parking management programs, peak period pricing, ramp metering, motorist information systems, route diversion strategies, incident management

and enhancement of alternative modes of transportation including bicycling and walking.

Action 4G.8
Provide management training and technology-sharing for public and private transportation providers and operators.

Policy 2C – Relationship of Interurban and Urban Mobility
It is the policy of the State of Oregon to provide interurban mobility through and near urban areas in a manner which minimizes adverse effects on land use and urban travel patterns.

Action 2C.1
Plan and design interurban corridors in and near urban areas to preserve their utility for interurban travel. Appropriate means to manage highways might include ramp metering, limited interchanges, high occupancy vehicle lanes, access control, separated express lanes for through traffic and tolls. Appropriate means for other modes might include station and stop locations. The State of Oregon shall avoid highway capacity improvements which primarily serve commuters from outside of urban growth and urban containment boundaries.

Policy 4M – Private/Public Partnership
It is the policy of the State of Oregon to involve the private sector to the fullest practical extent in the planning and implementation of the Oregon Transportation Plan.

Action 4M.1
Establish private sector participation in the transportation policy and systems plans at all levels of government in Oregon.

Action 4M.2
Employ a variety of incentives, established in concert with private interests, to private participation in the implementation of this plan in preference to directives and/or regulation.

Action 4M.3
Provide stable, consistent funding for the implementation of this plan to encourage the private sector to commit similarly long-term investments.

Technology in the Current Oregon Highway Plan

The 1999 Oregon Highway Plan (OHP) identifies the importance of ITS and the potential benefits that these applications can provide in Oregon. OHP Policy 2E and associated actions provide a basis for considering ITS applications to improve system performance and safety.

Oregon Highway Plan Policies and Actions Related to Technology

Policy 2E – Intelligent Transportation Systems
It is the policy of the State of Oregon to consider a broad range of Intelligent Transportation Systems services to improve system efficiency and safety in a cost-effective manner. Deployment of ITS shall reflect the user service priorities established in the Oregon Intelligent Transportation Systems Strategic Plan. Specifically:

- *Incident Management*
- *En-route Driver Information*
- *Traffic Control (Arterials and Freeways)*
- *Route Guidance*
- *Commercial Vehicle Electronic Clearance*
- *Pre-trip Travel Information*
- *Public Transportation Management*
- *Emergency Notification and Personal Security*
- *Emergency Vehicle Management*
- *Commercial Fleet Management*

Action 2E.1
Establish planning, management, budgeting and project selection processes within ODOT to encourage timely, cost-effective deployment of ITS applications, including:

- *Creating and maintaining an ITS office in ODOT to evaluate and implement ITS, implement ITS strategies, provide outreach and coordination among agencies, technology integration, education and program development and assessment and partnership;*
- *Encouraging the use of ITS in corridor and transportation system plans and ITS proposals in the Statewide Transportation Improvement Program process; and*
- *Creating budgets for ITS operational and maintenance requirements within the ODOT regions.* (Much of this has been, or is being, done.)

Action 2E.2
Expand traffic management capabilities in metropolitan areas through the use of ramp meters, variable message signs and closed circuit television to address recurrent congestion and enhance incident management. (Ongoing process)

Action 2E.3
Expand incident management capabilities in metropolitan areas and along key freight and recreational routes around the state where traffic incidents cause severe non-recurrent congestion. (Ongoing process)

Action 2E.4
Continue to advance commercial vehicle applications of ITS such as the Greenlight Project. (Ongoing process)

Action 2E.5
Work with local and regional governments and law enforcement agencies to deploy an effective advanced traffic management system in each metropolitan area. (Ongoing process)

Action 2E.6
Create a statewide network for real-time weather, road condition, traffic, traveler services and public transportation information. (Ongoing process: TripCheck, 511)

Action 2E.7
Encourage transit operators and emergency service providers to develop standardized dispatching, vehicle monitoring and vehicle priority systems. (Ongoing process)

Action 2E.8
Create a toolbox of standardized ITS applications that can be applied in small cities and rural areas. These products will emphasize enhancements for safety, traveler information, incident response and congestion relief. (Ongoing process)

Action 2E.9
Foster public/private partnerships to further ITS development and funding. (Ongoing process)

Action 2E.10
Develop an advanced high-speed telecommunications facility to serve as the communications backbone to statewide ITS deployment in partnership with private communications providers. (Evaluate current situation)

Recommendations for the Oregon Transportation Plan Update

In order to take advantage of the benefits that ITS can provide, the Oregon Transportation Plan Update should consider the development and implementation of the following policy suggestions.

1. The OTP should incorporate policies to enhance the development of ITS solutions, recognize the major ITS benefit areas and identified trends and further expand the consideration of ITS services to the multimodal transportation system.

2. The OTP should recognize the benefits that ITS development can provide the transportation system as a whole and promote the utilization of these solutions when applicable and cost effective.

3. In accordance with AASHTO, FHWA and funding reauthorization trends, the OTP should enhance the focus on transportation system operations and management along with supporting an increased emphasis on customer service in transportation.

4. OTP policies should recognize that the public sector must continue to play a large role in ITS development in order to expand ITS services across the transportation system.

5. Policies should encourage the development and utilization of infrastructure that interacts with vehicles and system users, takes advantage of developing vehicle safety features and provides additional traveler information via new technologies. This includes communication, mapping and information sharing protocols.

6. The OTP should support the use of ITS in providing security measures and enhancing traveler safety across the transportation system.

7. The OTP should encourage the development of strategies and the integration of transportation and emergency management systems to improve transportation system security and improve the coordination of emergency and disaster response.

8. Policies should support the development of transportation system operations and management strategies to improve travel time reliability for system users.

9. The OTP should encourage the development of operations performance measures that improve the ability to manage and operate the transportation system.

10. The following modifications could be made to Oregon Highway Plan policies and incorporated into Oregon Transportation Plan policies:

    Policy 2E – Intelligent Transportation Systems
    It is the policy of the State of Oregon to consider a broad range of Intelligent Transportation Systems services to improve system efficiency and safety in a cost-effective manner.

    Action 2E.2
    Expand traffic management capabilities in metropolitan areas through the use of ramp meters, variable message signs and closed circuit television to address recurrent congestion and enhance incident management.

Action 2E.3
Expand traffic and incident management capabilities in metropolitan areas and along key freight and recreational routes around the state where traffic incidents cause severe non-recurrent congestion.

Action 2E.4
Continue to advance ITS projects that improve the efficiency and safety of freight movement.

Action 2E.5
Work with local and regional governments and law enforcement agencies to deploy an effective Advanced Traffic Management System (ATMS) in each metropolitan area.

Action 2E.6
Continue to expand the statewide traveler information system to deliver real-time weather, road condition, traffic, traveler services and public transportation information.

Action 2E.7
Encourage transit operators and emergency service providers to develop standardized dispatching, vehicle monitoring, vehicle priority systems and real-time customer information systems.

Action 2E.8
Create a toolbox of standardized ITS applications that can be applied in small cities and rural areas. These products will emphasize enhancements for safety, security, traveler information, incident response and congestion relief.

Action 2E.9
Foster public/private and interjurisdictional partnerships to further ITS development and funding and improve transportation system operations and management.