



INTELLIGENT TRANSPORTATION SYSTEMS IN WHATCOM COUNTY

A REGIONAL GUIDE TO ITS TECHNOLOGY



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INTELLIGENT TRANSPORTATION SYSTEMS IN WHATCOM COUNTY INTRODUCTION

Intelligent Transportation Systems (ITS) are transportation improvements that rely on the collection, transmission, and application of real-time data and information. ITS deployments assist with transportation planning, incident management, increasing mobility, and minimizing congestion to make travel easier.

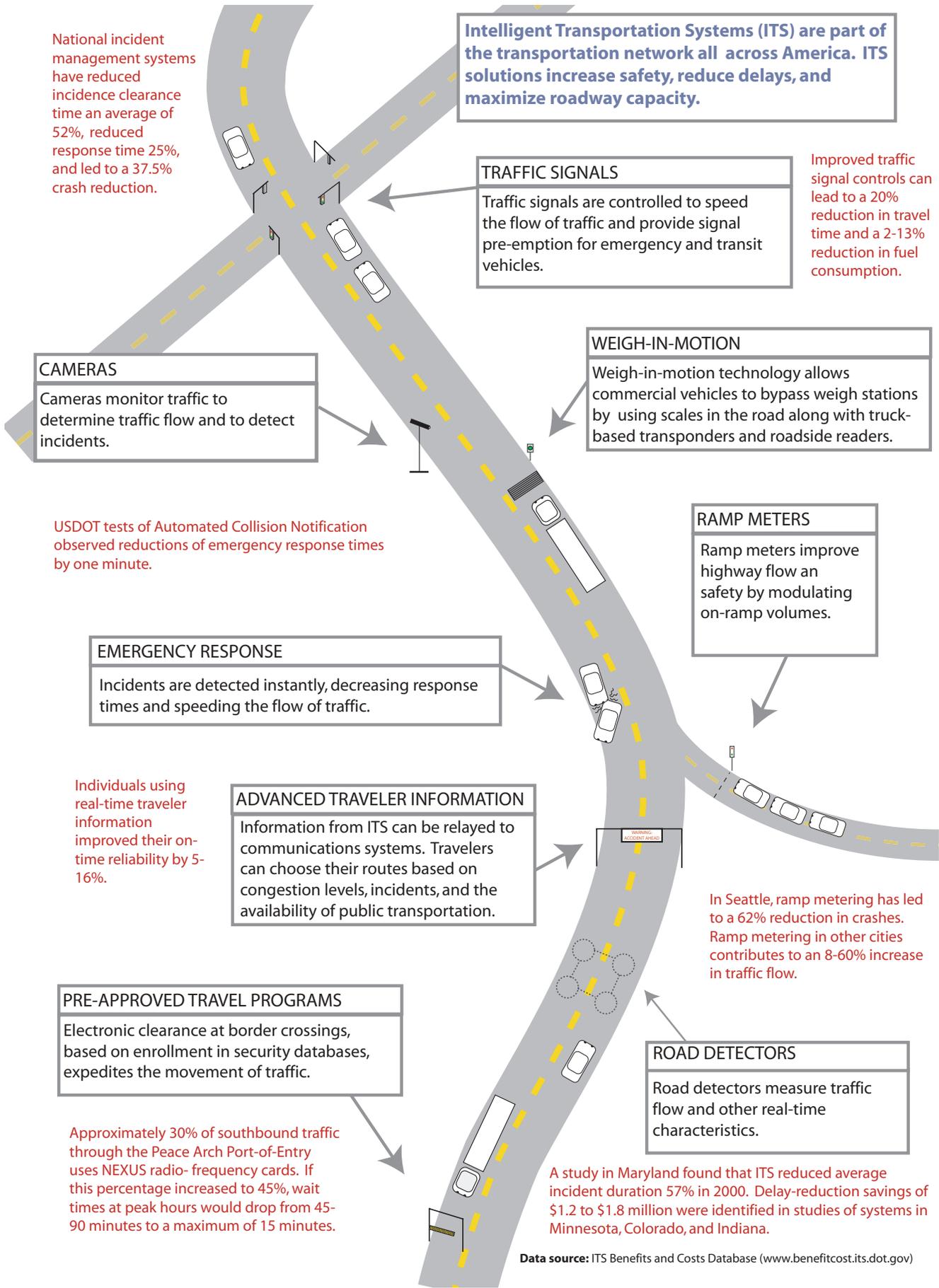
ITS provide real information about the road network, increasing the efficiency of transit systems and the existing roadways, as well as helping improve emergency response time. ITS technology is used by emergency service agencies, transit operators, city planners, commercial vehicle operators, and by individual drivers.

Many ITS applications are visible on a daily basis: road signs that change their messages to reflect current road conditions; traffic lights that provide priority to emergency vehicles; in-vehicle assistance systems that allow people to contact help if needed. There are hundreds of different applications of ITS technology and services in use across America today, and each of these applications are united under an ITS Architecture, which brings different ITS systems together and coordinates the collection and dissemination of information.

The Bellingham Traffic Management Center controls the camera systems and signalization in the City of Bellingham.



INTELLIGENT TRANSPORTATION SYSTEMS IN WHATCOM COUNTY
WHAT ITS CAN DO



National incident management systems have reduced incidence clearance time an average of 52%, reduced response time 25%, and led to a 37.5% crash reduction.

Intelligent Transportation Systems (ITS) are part of the transportation network all across America. ITS solutions increase safety, reduce delays, and maximize roadway capacity.

TRAFFIC SIGNALS
Traffic signals are controlled to speed the flow of traffic and provide signal pre-emption for emergency and transit vehicles.

Improved traffic signal controls can lead to a 20% reduction in travel time and a 2-13% reduction in fuel consumption.

CAMERAS
Cameras monitor traffic to determine traffic flow and to detect incidents.

WEIGH-IN-MOTION
Weigh-in-motion technology allows commercial vehicles to bypass weigh stations by using scales in the road along with truck-based transponders and roadside readers.

USDOT tests of Automated Collision Notification observed reductions of emergency response times by one minute.

EMERGENCY RESPONSE
Incidents are detected instantly, decreasing response times and speeding the flow of traffic.

RAMP METERS
Ramp meters improve highway flow and safety by modulating on-ramp volumes.

Individuals using real-time traveler information improved their on-time reliability by 5-16%.

ADVANCED TRAVELER INFORMATION
Information from ITS can be relayed to communications systems. Travelers can choose their routes based on congestion levels, incidents, and the availability of public transportation.

In Seattle, ramp metering has led to a 62% reduction in crashes. Ramp metering in other cities contributes to an 8-60% increase in traffic flow.

PRE-APPROVED TRAVEL PROGRAMS
Electronic clearance at border crossings, based on enrollment in security databases, expedites the movement of traffic.

Approximately 30% of southbound traffic through the Peace Arch Port-of-Entry uses NEXUS radio-frequency cards. If this percentage increased to 45%, wait times at peak hours would drop from 45-90 minutes to a maximum of 15 minutes.

ROAD DETECTORS
Road detectors measure traffic flow and other real-time characteristics.

A study in Maryland found that ITS reduced average incident duration 57% in 2000. Delay-reduction savings of \$1.2 to \$1.8 million were identified in studies of systems in Minnesota, Colorado, and Indiana.

Data source: ITS Benefits and Costs Database (www.benefitcost.its.dot.gov)



INTELLIGENT TRANSPORTATION SYSTEMS IN WHATCOM COUNTY BENEFITS OF ITS

Intelligent Transportation Systems technology is used to increase safety, reduce delays, and maximize roadway capacity. There are numerous measurable benefits from including ITS in any transportation network:

Reduced Congestion

Congestion reduction is one of the primary benefits of ITS technology. Information collected through detectors in the road, video cameras, and advanced communication technologies are used to send traffic information to management centers, advanced traveler information systems, and emergency dispatch centers. This information is used to redirect traffic away from congestion, to expedite incident management, to reduce emergency-related delays, and to control traffic signals and ramp meters to speed the flow of traffic.

Increased Safety

The installation of ITS emergency service applications has led to measurable reductions in traffic fatalities and has decreased the response time of emergency vehicles. Nationwide, ITS services have led to a 34 percent reduction in crashes, a 24 percent reduction in injury crashes, and between a 50-60 percent reduction in accident-related traffic delays.

Cleaner Air

A decrease in traffic incidents leads to a decrease in delays, which in turn reduces the amount of fuel consumed. Improved traffic signal systems reduce idling time and decrease emissions. Better-run transit systems encourage a reduction in single-occupancy vehicles. And improved mobility on existing road networks reduces the need for the construction of new roads.

Improved Transit Systems

Computer-aided dispatch systems manage fleets better, cut costs, and improve the level of service. Automated vehicle identification improves on-time performance. And demand-responsive transit systems reduce operating expenses.

Reduced Operational Costs

ITS technology substitutes information for infrastructure as a way to increase capacity and enhance the performance of the transportation system cleanly and efficiently, with minimal noise increases, construction, environmental impact, or use of land. The costs of construction are proportionally much higher - in some cases, ITS solutions can add half the capacity of an additional lane at only one-eighth the cost of construction.

Improved Data Sharing

By encouraging regional government entities to work together to develop seamless ITS solutions, the availability and quality of transportation data is enhanced. Resulting information can be used for system planning, maintenance, and road safety.

Bellingham Fire Department vehicles use ITS technology for signal pre-emption at intersections.





INTELLIGENT TRANSPORTATION SYSTEMS IN WHATCOM COUNTY ITS APPLICATIONS

ITS applications are divided into *market packages*, categories which define what the technology is used for. There are seven main categories of market packages.

Advanced Traffic Management Systems

Incident Management System - provides links between transportation and emergency management centers to exchange information.

Electronic Toll Collection - uses electronic tags to collect tolls and process violations without requiring motorists to stop.

Roadway Closure Management - remotely controlled barriers that close off roads in unsafe conditions, working in conjunction with camera surveillance and traveler information.

Advanced Traveler Information Systems

Broadcast Traveler Information - dissemination of real-time information through radio, television, or variable message signs to help travelers select the best route for their trip.

Autonomous Route Guidance - in-vehicle or handheld electronic devices used to provide trip planning information and directions.

Advanced Public Transit Systems

Transit Traveler Information - provides customized, real-time transit information to travelers, including signs with estimated arrival times for buses, or online information for trip planning.

Transit Passenger and Fare Management - allows electronic fare payments.

Emergency Management

Emergency Routing - provides automatic vehicle location and dynamic routing for emergency vehicles.

Mayday Support - supports response to requests for help from in-vehicle or call-box systems.

Wide-Area Alert - facilitates the use of highway-advisory radio or message signs to spread emergency alert messages, such as the Amber Alert system.

Commercial Vehicle Operations

Weigh-in-Motion - commercial vehicles can be weighed by equipment embedded in the highway, eliminating the need for the truck to pull over at a traditional weigh station.

Freight Administration - electronic tracking of cargo movements from origin to destination, including alerts of possible tampering.

Maintenance and Construction

Road Weather Data Collection - collection of weather and road conditions using sensors installed near the roadway.

Roadway Automated Treatment - automated anti-icing systems for bridges and roadways.

Work Zone Management - a system providing construction delay and routing information en-route to drivers, as well as a system to provide this information to other agencies.

Archived Data

ITS Data Warehouse - stores data gathered by ITS for future analysis for multiple agencies.



INTELLIGENT TRANSPORTATION SYSTEMS IN WHATCOM COUNTY ITS IN WHATCOM COUNTY

ITS technology is being used at multiple locations throughout Whatcom County.

City of Bellingham Priority Signals

Bellingham's traffic signals use ITS to give a green light to approaching emergency vehicles.

Whatcom County Traffic Signals

The City of Bellingham operates the traffic signals for other cities in Whatcom County. The systems use loops embedded in the road as well as the Bellingham Traffic Management Center to monitor the flow of traffic

Speed Monitoring

Whatcom County and the City of Bellingham operate portable systems which monitor the speed of vehicles on roadways, posting the speed on message signs to notify travelers.

Traffic Cameras

Cameras have been installed in Bellingham and Blaine to monitor traffic along Interstate 5 and at the border crossings. Cameras are linked to a website to allow travelers to devise trip plan based on current traffic flow.

Advanced Traveler Information Systems

Newly installed variable message signs on Interstate 5 will soon provide real-time information about construction and border-related delays. Highway Advisory Radio also provides travelers with pre-recorded travel information.

Traffic lights on Sunset Drive use cameras to detect vehicle queues.



An Advanced Traveler Information System (ATIS) variable message sign on northbound Interstate 5.



Transit Security

Whatcom Transportation Authority uses cameras at transit centers and alarms on its buses to increase the security of transit passengers.

Commercial Vehicle Operations

ITS projects for commercial vehicles improve the safety of Whatcom County roads and highways and helps to speed their passage through the U.S. - Canada border. Whatcom County participates in several nationally-recognized pilot projects to improve safety and expedite movement of commercial vehicles.

Emergency Management Systems

Computer-aided dispatch systems, emergency vehicle tracking systems, and roadway service patrols are some of the emergency management ITS solutions currently in use in Whatcom County. More ITS market packages to improve emergency response are planned.

Evacuation and Re-entry Management

Programs are in place and planned for future expansion which use ITS to coordinate emergency evacuation and re-entry plans of transportation and safety agencies.

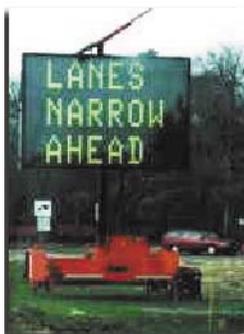
Border Travel Programs

Using radio-frequency cards and sensors, participants enrolled in NEXUS can cross between the U.S. and Canada at three Whatcom County ports-of-entry using a dedicated commuter lane, reducing wait times at the border. As part of the binational Free and Secure Trade (FAST) Program, enrolled commercial vehicles use a similar system for priority clearance at the border.

WTA buses have alarm systems installed. Cameras at transit centers increase passenger safety while customers wait for their bus.



Portable message signs provide real-time information to drivers.



Maintenance Management

Construction delay and routing information is provided to Whatcom County residents using message signs and the internet. Information critical for maintaining the county roadways is collected using various ITS tools including weather sensors.



INTELLIGENT TRANSPORTATION SYSTEMS IN WHATCOM COUNTY INCORPORATING ITS INTO JURISDICTIONAL COMPREHENSIVE PLANS

ITS should be viewed as tools that offer a range of improvements for all modes of transportation. Policies that encourage ITS applications can be incorporated into city and county comprehensive planning processes and can also complement more traditional solutions (i.e. traffic controls and widening for existing roadways).

There are three ways that ITS can be included in the comprehensive plans of Whatcom County and its jurisdictions:

1. As an integrated element of other transportation strategies - using an existing transportation or transit-related section in the comprehensive plan, include a goal that specifically mentions ITS solutions.
2. As a distinct element - include a separate ITS vision statement or an ITS section within the comprehensive plan.
3. Both distinct and integrated - ITS does not always fit under the umbrella of existing transportation strategies in comprehensive plans. Some plans therefore create a separate goal in their transportation section to address ITS. Others simply recommend considering ITS options in other sections of the plans.

More information and assistance on incorporating ITS into comprehensive planning is available on the *ITS in Whatcom County* website (www.wcog.org/its), and through the Whatcom Council of Governments (360) 676-6974.

Specific examples of ITS language in comprehensive plans is on the following page.

Weigh-in-motion systems measure the weight of commercial vehicles as they travel along the highway, eliminating the need for them to stop at weigh stations along their route.



As an integrated element

Under a transit-related section of an existing plan element:

Real-time transit information systems should be added to schedules already in place.

Under a transportation goal section

Develop and implement ITS to create safer roads and better informed travelers through technologies such as congestion monitoring; automatic accident alert systems; on-board navigation; and weighing and inspection of commercial vehicles in motion.

As a distinct element

As a separate ITS vision statement in an existing plan

To maximize transportation productivity, mobility, efficiency, and safety through the use of cost-effective ITS technologies.

Both distinct and integrated

As a separate ITS goal in a comprehensive plan

Use ITS where appropriate to achieve the following goals:

- Increase efficiency of the transportation system
- Enhance safety
- Support transportation operations and planning
- Minimize cost
- Provide framework for system evolution
- Provide for system responsiveness and flexibility



INTELLIGENT TRANSPORTATION SYSTEMS IN WHATCOM COUNTY WHATCOM COUNTY REGIONAL ITS ARCHITECTURE

The Whatcom County Regional ITS Architecture is a federally mandated planning document that provides a framework for the integrated deployment of ITS within Whatcom County.

The purpose of the Architecture is to serve as a guide for the development of ITS projects and programs and to be consistent with ITS strategies and projects contained in applicable transportation plans. By law, it must be consistent with the National ITS Architecture and include the following elements:

- Description of the region or project
- Identification of stakeholders
- Operational concept
- Interagency agreements
- System functional requirements
- Interface requirements and information exchanges
- Identification of ITS standards
- Sequence of projects required for implementation.

The Whatcom County Regional ITS Architecture was completed in 2004 and is the basic resource document for existing and planned ITS packages in the County. An electronic version of the Architecture is available online at www.wcog.org/its.

Cameras at intersections help monitor the flow of traffic and detect incidents as they happen for an immediate response.



There are numerous resources available on the internet which provide more detailed information about ITS applications, costs, and benefits.

ITS in Whatcom County Website - This website is part of the Whatcom Council of Government's effort to inform citizens and elected officials of the benefits of ITS in Whatcom County's transportation systems. www.wcog.org/its

National ITS Architecture - The U.S. Department of Transportation's National ITS Architecture provides a framework for planning, defining, and installing Intelligent Transportation Systems. www.its.dot.gov/arch/arch.htm

ITS Document Library - The U.S. Department of Transportation provides an extensive collection of ITS-related documents and presentations www.its.dot.gov/itsweb/welcome.htm

ITS America - The Intelligent Transportation Society of America coordinates the development and deployment of ITS in the United States www.itsa.org

ITS Benefits and Costs Database - This website offers a database of cost-benefit information for national ITS initiatives. www.benefitcost.its.dot.gov

ITS Washington - This professional organization in Washington State is dedicated to providing ITS information and education. <http://depts.washington.edu/itswa>

ITS Cooperative Deployment Network - ICDN is a cooperative effort to share and exchange ITS information through an internet resource produced by the Institute of Transportation Engineers (ITE) and funded by the U.S. Department of Transportation. www.nawgits.com/icdn.html



INTELLIGENT TRANSPORTATION SYSTEMS IN WHATCOM COUNTY CONCLUSION

Intelligent Transportation Systems (ITS) can increase capacity, safety, and the effectiveness of Whatcom County's transportation network by using information, technology, and communications. There is a diverse range of ITS applications available today which are designed to improve transportation system performance, often costing less than traditional construction solutions to strained roadways.

ITS benefits to regional transportation networks have been documented in numerous ways, depending on which ITS packages are implemented. Reduced congestion, increased safety, faster emergency response, cleaner air, improved transit services, and reduced operational costs are some of the benefits attributed to ITS.

ITS are already used in Whatcom County. Priority signals for emergency vehicles, real-time construction delay information, speed monitoring, and traffic cameras are just some of the ways ITS solutions improve Whatcom County's transportation network. Future plans included in the Whatcom County Regional ITS Architecture call for an increase in ITS deployments to enhance the road system.

Whatcom County and its jurisdictions need to continue to consider ITS solutions to meet the transportation needs of rural and urban communities. Therefore it is critical to incorporate ITS planning into the county and jurisdictional comprehensive plans. Including ITS encourages jurisdictions to consider alternative ways to enhance capacity and safety of the existing transportation network without relying solely on construction, and also helps coordinate regional ITS implementation.

In addition, ITS technologies provide supplemental data which help planners understand how the transportation system is being used today, and forecast where needs will be in the future. Through archived ITS data and through inter-agency data sharing, ITS can serve another useful function in Whatcom County's transportation system.

More information about ITS and incorporating ITS into Whatcom County's regional comprehensive plans is available through:

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