

Washington State Department of Transportation



TRANSPORTATION TECHNOLOGY AT THE WASHINGTON- BRITISH COLUMBIA INTERNATIONAL BORDER



FINAL REPORT

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1. INTRODUCTION

The international land border between Washington and British Columbia is not based on a geological or natural feature but rather follows the imaginary line of the 49th parallel. But the border is a very real legal, jurisdictional, and physical boundary between the United States and Canada. The United States Department of Homeland Security, Bureau of Customs and Border Protection (CBP) and the Canada Border Services Agency (CBSA) are responsible for ensuring that only permitted persons and goods enter their respective countries. The inspection process requires cars and trucks to stop with the result being a secure border and a certain level of traffic congestion on the roadways approaching the border. The level of congestion varies with the intensity of the inspection process and the number of vehicles crossing the border. Addressing traffic congestion is generally the responsibility of transportation agencies and along this border. The primary responsibility rests with the Washington State Department of Transportation (WSDOT) and British Columbia Ministry of Transportation (MoT). The challenge for border inspection and transportation agencies is seeking cooperative ways to find the proper balance between security and traffic flow across the border. This report looks at how applications of transportation technology can be used to address this challenge.

The four international border crossings between Whatcom County, Washington and British Columbia are called the Cascade Gateway. The Gateway consists of the following four roadway crossings going from west to east:

- I-5 / BC Highway 99 (Peace Arch/Douglas – passenger vehicles only)
- Washington State Route (SR) 543 / BC Highway 15 (Pacific Highway – passenger vehicles and commercial vehicles)
- SR 539 / BC Highway 13 (Lynden/ Aldergrove – passenger vehicles and commercial vehicles)
- SR 9 / BC Highway 11 (Sumas/Huntingdon – passenger vehicles and commercial vehicles)



Exhibit 1-1: Cascade Gateway

All of these crossing provide an easy connection to Interstate 5. I-5 is a High Priority Corridor on the National Highway System and is a key North American trade corridor extending from Canada to Mexico. The road connects the entire west coast and provided easy access to multiple ports including Seattle, Tacoma, Oakland and Los Angeles.

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The importance of these crossing is underscored by Canada's status as the United States' number one trading partner. Between 1994 and 2000, US trade with Canada increased from \$243 billion to \$406 billion, an average annual growth rate of 8.9 percent¹. Enormous amounts of trade cross the border in the Pacific Northwest between Washington State and British Columbia. Two-way trade at the Pacific Highway border crossing was valued at more than \$35 million per day in 2000. Commercial truck traffic across the Washington State/British Columbia border also has been increasing since the implementation of the North American Free Trade Agreement (NAFTA)². This growth in trade and commercial truck traffic has strained border crossing facilities and enforcement agencies. As a result, commercial vehicles are often delayed at the border, and long queues of trucks waiting to cross in either direction are a common sight. It has been estimated that \$40 million in operating costs are lost annually due to border crossing delays at just the Blaine crossing³. These delays have increased due to increased security concerns following the 9/11 attacks.

Intelligent Transportation Systems (ITS) are defined as the application of technology to improve transportation system efficiency, operations, and safety. WSDOT has put forth an extensive statewide effort to deploy ITS applications to address identified and appropriate critical regional and statewide transportation problems. Several of WSDOT's most prominent ITS projects have involved the use of ITS applications to address issues surrounding the movement of people, vehicles and goods across the international border between Washington State and British Columbia. BC MoT has a similar program in underway. Both WSDOT and BC MoT, in collaboration with federal, state, provincial, regional and local stakeholders on both sides of the border, have led and funded multiple ITS projects related to the secure and efficient movement of people and goods across the border. These projects include Commercial Vehicle Operations (CVO) initiatives and Advanced Traveler Information Systems (ATIS). CVO applies technologies to help enhance safety and simplify credentialing and tax administration, roadside enforcement, freight and fleet management, and vehicle operations. It also has applications to intermodal connections, such as at rail and seaports, and international border crossings. ATIS uses advanced data collection and processing to provide real-time information to travelers regarding travel times and road conditions.

This report is the result of a review and analysis of the technologies and systems deployed by transportation and border inspection agencies along the Cascade Gateway that affect highway vehicle border crossing traffic. The purpose of this project was to:

- Assess the benefits and issues of the existing border technology deployments.
- Determine their impacts on transportation movements.
- Identify potential opportunities for transportation agencies to work with border inspection agencies to use appropriate technology to address border congestion issues.

The remainder of this report is divided into the following sections:

- **The International Border and The Trade Flow:** An overview of the issues and challenges of the border environment and how freight is moved into and out of the country.
- **Public Agencies at the Border:** A review of the many different public agencies whose jurisdictions include the border.
- **Current Programs and Projects:** An inventory of transportation and border agency projects and programs that are ongoing or planned at the border.

¹ US Department of Transportation, Bureau of Transportation Statistics, *North American Trade and Travel Trends*, BTS02-07, Washington, D.C., 2001.

² Whatcom Council of Governments, www.wcog.org, 2002.

³ US Department of Transportation, Bureau of Transportation Statistics, *North American Trade and Travel Trends*, BTS02-07, Washington, D.C., 2001

- **Problem Analysis:** Considering the information in the previous sections, this section identifies “gaps” between the technical and operational requirements of WSDOT and the current and planned programs and projects.
- **Recommended Concept of Operations:** This section presents a recommended concept of operations for information sharing and coordination between entities at the border.
- **Recommendations for Future Projects:** Working within the constraints of the border environment, this section examines potential project and program recommendations to address the problems identified in the previous sections and implement the recommended Concept of Operations, paying particular attention to the merit of expanding existing deployments.

2. THE INTERNATIONAL BORDER AND TRADE FLOW

2.1 Vehicle Movement Across the Border

Vehicle movement across the border is generally divided into passenger car and commercial vehicle movements. For passenger cars, the border inspectors verify the ability of drivers and passengers to enter the country and the appropriateness of the goods that they are carrying. Generally, the goods carried in passenger cars are for the occupants of the vehicle and not being carried for a third party.

The movement of goods between countries adds additional complexity to truck movements across the border. The following Exhibit 2-1 presents a simplified overview of the process. This diagram provides some context on the environment in which transportation and border agencies must work together.

Starting in the upper left hand corner, the shipper has the need to move cargo across the border. The shipper prepares required documentation for the movement of the cargo. This primarily done electronically through a number of automated systems provided by both countries. The shipper engages a carrier (internal or for hire) who provides a suitable vehicle to carry the cargo and a driver for the vehicle. The driver, vehicle and cargo arrive at the border crossing for inspection by the border agency personnel. The border agency staffs have access to systems that contain the electronic documentation filed by the shipper. The custom inspector ensures that the driver, vehicle, and the cargo have the proper

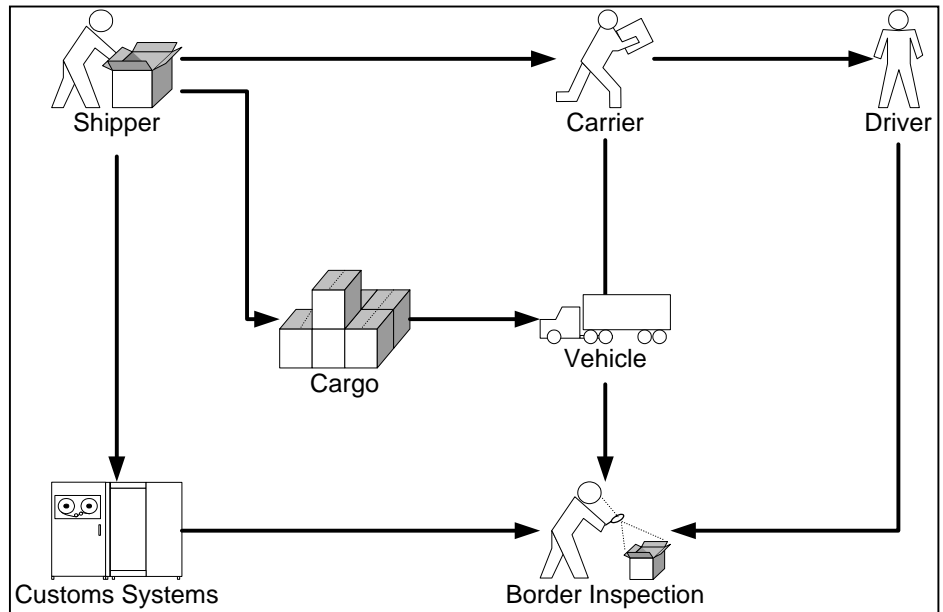


Exhibit 2-1: The Trade Flow

documentation. The custom inspector ensures that the driver, vehicle, and the cargo have the proper

credentials to allow for their entry into the country. Both border agencies have implemented a wide range of programs and systems that allow for the electronic filing of most documentation, assess the risk of each movement, and provide inspectors at the border with access to this information. Additional details on these programs are provided later in the report.



The increasing amount of trade between the US and Canada has strained the existing processing and inspection infrastructure along the Cascade Gateway. In response, the Pacific Highway Port of Entry in Blaine was completely redesigned in the late 1990s. Construction of four new facilities, including an Automobile and Bus Processing Building, Cargo Building, Warehouse, and Parking Facility was completed. Expanded border inspection facilities on both sides of the border are planned for construction over

the next few years. A southbound truck staging area off of Highway 11 is currently under construction. The staging area will provide parking for commercial vehicles and redirect commercial traffic away from passenger traffic heading south. More information on planned capital improvements is provided in Section 3.

2.2 Cascade Gateway Travel Data

The regular sight of long queues of vehicles at the border crossings has increased the need for the monitoring and analysis of border crossing travel data. The Whatcom Council of Governments (WCOG) as the Metropolitan Planning Organization (MPO) for Whatcom County has compiled automobile and truck cross-border volume data collected by CBP and Statistics Canada for the years 1992 – 2002. The data for that period indicate that passenger vehicle volumes have actually decreased in both directions at all of the Cascade Gateway crossings. Interestingly, at the beginning of the period, the number of southbound passenger vehicles using the Peace Arch/Douglas crossing versus Pacific Highway was substantially higher in the year 1992 (approximately 3.4 million versus 2 million) than in 2002 (1.23 million versus 1.18 million). A similar trend was seen with northbound passenger vehicle volumes.

For commercial vehicles, however, significant growth has been seen. Pacific Highway southbound truck volumes have increased 32% from 1992 – 2002, and 51% in the northbound direction. At the Sumas/Huntingdon and Lynden/Aldergrove crossings, truck volumes have more than doubled during this period in both directions.

In 2001, WCOG commissioned a Cross Border Trade and Travel Study, which analyzed data collected during intercept surveys to address a number of questions about travel patterns across the border. One of the topics considered was the potential for traffic to be diverted to another crossing. Survey participants were asked why they chose to use a particular crossing. Approximately 90% of respondents stated that they chose the crossing based on fastest/most direct route. Only about 5% chose their route based upon trying to avoid congestion.

Like drivers of passenger vehicles, truck drivers overwhelmingly report that they choose their crossing because it is the fastest, most direct route. However, a significant percentage chooses a crossing because of the crossing location of their customs broker. Once paperwork is forwarded to the customs broker, the truck driver does not have the option of using another crossing.

3. PUBLIC AGENCIES AT THE BORDER

The jurisdictions and missions of many public agencies overlap at the border crossings. This section provides an overview of the responsibilities and organization of the key border security and transportation agencies.

3.1.1 BORDER AGENCIES

In 2001, Canada and the US signed the Smart Border Declaration, which created an action plan for relieving congestion at key border crossings by investing reciprocally in border infrastructure and identifying technological solutions to speed movement across the border.

The **US Bureau of Customs and Border Protection (CBP)**, under the Department of Homeland Security, is the border security agency for the United States. CBP became an official agency of the Department of Homeland Security on March 1, 2003, combining employees from the Department of Agriculture, the Immigration and Naturalization Service, the Border Patrol and the US Customs Service. CBP's primary mission is to serve as the guardian of America's borders to ensure only allowable persons and goods entry the country.

On December 12, 2003, the Canada Customs and Revenue Agency (CCRA) became the Canada Revenue Agency (CRA). The customs program is now part of the new **Canada Border Services Agency (CBSA)**. The CBSA brings together all the major players involved in facilitating legitimate cross-border traffic and supporting economic development while stopping people and goods that pose a potential risk to Canada. It integrates several key functions previously spread among three organizations: the Customs program from the Canada Customs and Revenue Agency, the Intelligence, Interdiction and Enforcement program from Citizenship and Immigration Canada, and the Import Inspection at Ports of Entry program from the Canadian Food Inspection Agency⁴.

The work of the CBSA includes:

- Processing commercial goods, travelers, and conveyances, and identifying and interdicting high-risk individuals and goods.
- Conducting secondary inspections of food and agricultural products imported by travelers at airports.
- Conducting intelligence, such as screening visitors and immigrants and working with law enforcement agencies to maintain border integrity and ensure national security.
- Engaging in enforcement activities, including investigations, detentions, hearings, and removals.
- Supporting free trade negotiations.
- Conducting compliance audit reviews and dumping and subsidy investigations.

Both national and local border agency staffs actively work with border area stakeholders to develop and implement strategies, programs and projects to improve the flow of persons and goods across the border.

3.1.2 TRANSPORTATION AGENCIES

The **Washington State Department of Transportation (WSDOT)** is responsible for operating and maintaining state routes and interstates in Washington. WSDOT plans, designs, and constructs

⁴ Source: *About the CBSA*, <http://www.cbsa-asfc.gc.ca/agency/menu-e.html>

physical improvements to the highways that approach the border on the US side. WSDOT leads or is involved in most ITS projects and programs deployed in the state. WSDOT has led Washington's involvement in the Commercial Vehicle Operations programs and the deployment of a statewide traveler information system that includes information on conditions at the border. WSDOT also operates a Traffic Management Center in Bellingham, which enables monitoring and control of traffic surveillance cameras and traveler information systems at the border.

The **United States Department of Transportation (US DOT)** is the national transportation agency for the US, covering all modes of transportation. The mission of the Department is to: "Serve the United States by ensuring a fast, safe, efficient, accessible and convenient transportation system that meets our vital national interests and enhances the quality of life of the American people, today and into the future". Some of the administrations under the US DOT include the Federal Highway Administration (FHWA), and the Federal Motor Carrier Safety Administration (FMCSA). FHWA has several programs focusing on improving the highway infrastructure at the border and on the corridors approaching the border. FMCSA has jurisdiction over interstate motor carrier safety. They are working actively with individual states and Canada to improve electronic exchange of information.

The **British Columbia Ministry of Transportation (MoT)** is the provincial transportation agency for British Columbia. BC MoT is responsible for creating an integrated provincial transportation plan, maintaining and improving the highway system, and attracting and managing private sector investments in the transportation network. BC MoT, like WSDOT, is responsible for the planning, design and construction of infrastructure improvements on the highways approaching the border in Canada. BC MoT and WSDOT have collaborated on multiple projects involving the Cascade Gateway border crossings for both ITS and infrastructure improvements. Most recently, BC MoT began operation of the southbound border crossing ATIS, which provides real-time border wait times.

Transport Canada is the Canadian national transportation agency. Transport Canada sets policies, regulations and standards to protect the safety, security and efficiency of Canada's rail, marine, road and air transportation systems, including the transportation of dangerous goods and sustainable development. Transport Canada also manages and participates in projects and programs that are intended to improve border crossing movements.

3.1.3 CROSS-BORDER WORKING GROUPS

Stakeholders on both sides of the border have developed forums for bi-national consorting between transportation and border agencies, as well as other agencies whose jurisdiction includes an international border. These groups generally act to provide cross-border coordination of transportation and security projects, as well as to facilitate information sharing and improved communication between various agencies and their peers on the other side of the border.

The International Mobility and Trade Corridor (IMTC) Project is a US - Canadian coalition of businesses and government entities formed to jointly identify and pursue improvements to cross-border mobility in the Cascade Gateway.

IMTC initially came together in 1997 in response to growing cross-border congestion, increases in NAFTA trade volumes, and emerging national-level programs and policies aimed at improving cross-border mobility. Examples of such initiatives include the US Department of Transportation's Coordinated Border Infrastructure Program, the Shared Border Accord, and regional cross-border planning efforts by the US General Services Administration.

The shared goal is to better facilitate trade, transportation, and tourism with innovative improvements to infrastructure, operations, and technology. Over fifty public and private organizations from the US and Canada participate in the IMTC project. To effectively solicit funding for cross-border mobility improvements, IMTC serves as a forum through which regional projects are identified, prioritized, and then proposed for funding. Whatcom Council of Governments, under the guidance of the IMTC forum, submits annual funding applications to US DOT, WSDOT, and other funding sources.

In January 2002, Transport Canada and the US Department of Transportation hosted the inaugural meeting of the **Transportation Border Working Group (TBWG)**. The TBWG has the support of all nineteen border states and provinces and is mandated to meet semi-annually. The TBWG membership includes officials from CBSA and CBP. The TBWG aims to enhance communication and coordination on border transportation issues and build on the work of bi-national transportation planning mechanisms. Most significantly, it provides a vehicle for advancing border transportation initiatives of common interest, consistent with the broader Canada - US border management agenda.

The Canadian/American Border Trade Alliance is a broad based, grassroots bi-national organization comprised of businesses, private and public sector organizations, and individuals involved in US/Canadian trade, transportation and tourism. Membership is open to all Canadian and US private and public entities and individuals involved in US/Canadian border trade, border issues and border operations. Private and public sector participants presently include industrial shippers, customs brokerage firms, bridge and tunnel operators, motor carriers, railroad companies, economic development and trade corridor organizations, universities, chambers of commerce, banks and governments.

3.1.4 A DIFFERENCE IN MISSIONS

The cross-border working groups provide an important forum for cooperation between transportation agencies and border inspection agencies. But one must recognize that the missions of these two types of agencies are profoundly different. As an example, listed below are mission statements for WSDOT and the US CBP.

WSDOT Mission	US CBP Mission
<p><i>Our mission is to keep people and business moving by operating and improving the state's transportation systems vital to our taxpayers and communities. These are our management principles:</i></p> <ul style="list-style-type: none"> • Leadership • Delivery and Accountability • Business Practices • Safety • Environmental Responsibility • Excellence and Integrity • Communications 	<p><i>We are the guardians of America's Borders. We are America's frontline.</i></p> <p><i>We safeguard the American homeland at and beyond our borders.</i></p> <p><i>We protect the American public against terrorists and the instruments of terror.</i></p> <p><i>We steadfastly enforce the laws of the United States while fostering our Nation's economic security through lawful international trade and travel.</i></p> <p><i>We serve the American public with vigilance, integrity, and professionalism.</i></p>

While both agencies strive to provide the best service to the public, their individual missions are very different. At the core, the security and integrity of the international border falls under the

responsibility and ownership of the border agencies. The border agencies are focused on ensuring the security of border movements while improving efficiency of the border inspection process. They concentrate on each individual crossing and its related characteristics at the entry points to the country. Their electronic systems and processes must serve an international community. The transportation agencies are responsible for traffic flows and safety across the entire transportation system and tend to take an aggregated view of vehicles and movements. Therefore, transportation agencies such as WSDOT must look at how their transportation technology projects can “fit” into the border environment as defined by the border inspection agencies, recognizing that the agencies’ differing missions will result in different priorities.

4. CURRENT PROGRAMS AND PROJECTS

This section presents a summary of the projects and programs underway that impact vehicle movements across the border. These projects include capital improvements and technology projects, as well as the screening and tracking systems used by US and Canadian border inspection agencies.

4.1 Capital Improvements

A number of major construction projects are planned along the Cascade Gateway over the next ten years. WSDOT has roadway-widening projects planned on state highways approaching the border, including SR 9, SR 543, and SR 539. The SR 543 project, which is the northbound link to the major commercial vehicle crossing at Pacific Highway, includes the provision of a dedicated lane for low-risk commercial vehicles that are enrolled in the joint US-Canada Free and Secure Trade (FAST) program. This will allow lower risk movements to bypass the normal truck queue and reduce their wait time at the border. Additional details on the FAST program are provided later in this section.

At the I-5 interchanges in Blaine (Exits 274 and 276), WSDOT, City of Blaine, and FHWA are jointly developing a City of Blaine I-5 Interchange Access Point Decision Report. This effort will analyze the potential impact of the US Peace Arch facility expansion adjacent to the northern interchange (Exit 276). The report will also look at the existing partial southern interchange (Exit 274) and consider approaches to making this a full interchange for improved access. Both interchange revisions consider how impacts at the border may affect future access to the City of Blaine.

On the Canadian side of the border, the following capital projects are planned:

- BC MoT is widening BC Highway 15 at the Pacific Highway Crossing and adding a southbound lane which will be specifically designated for low-risk commercial vehicles that are enrolled in the joint US-Canada Free and Secure Trade (FAST) program.
- Dedicated NEXUS lanes will be added to BC Highway 15 (Pacific Highway) and Highway 99 (Peace Arch/Douglas). (The NEXUS program provided allows pre-cleared, frequent travelers with an electronic identification card to speed their passage across the border. More information on the NEXUS program is provided later in this section.)
- Improvements will be made to Highway 11 (Sumas/Huntingdon).
- Widening of 8th Avenue (east-west road between Highway 99 and Highway 15).

The US has recently completed the construction of a new border inspection station at Pacific Highway (SR 543) to better process southbound traffic with an emphasis on commercial

movements. Both the US and Canada are planning improvements at the Peace Arch/Douglas crossing. Canada is planning a new facility at the Lynden/Aldergrove crossing on Highway 13.

4.2 Advanced Traveler Information Systems

A major traveler information initiative recently completed is the deployment of a southbound cross-border Advanced Traveler Information System (ATIS) by British Columbia Ministry of Transportation (see Exhibit 4-1). Using a linked set of vehicle detectors before and after the US border inspection station, the system determines average wait times at both the Peace Arch/Douglas and Pacific Highway border crossings. The information is displayed on a web site and is available over an interactive voice response telephone system. The web site provides a link to images captured by closed-circuit cameras. The wait times are posted on dynamic message signs (DMS). The signs allow motorists to choose between the two border crossings based on relative wait times.

WSDOT is coordinating with BC MoT for the deployment of a parallel system for northbound travelers. Message signs and cameras have been deployed in the northbound direction along I-5. Congestion and wait time information will be based upon roadway detector information.



Exhibit 4-1: British Columbia ATIS Map

The WSDOT web site is regularly expanding to include more information related to the border, including bringing more traffic cameras online and providing a traffic conditions map of I-5 through Bellingham (Exhibit 4-2).

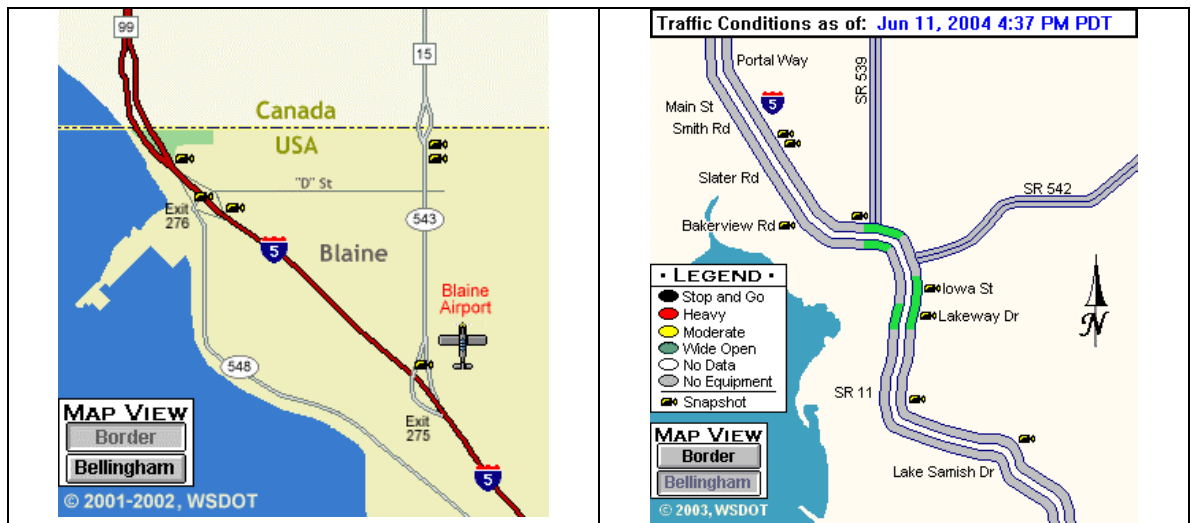


Exhibit 4-2: WSDOT Border Cameras and Bellingham Traffic Map

Additional statewide traveler information is found on the WSDOT website and available through the new, voice interactive, 511 traveler information phone system.

4.3 Bi-National / Regional Travel Demand Model

The Whatcom Council of Governments is developing a cross-border transportation demand model that will be able to estimate the demand for the movement of people or goods by mode and time period. The information generated will be used to assess policy initiatives and support economic analysis of infrastructure alternatives and infrastructure design. This model will be the first of its kind in North America to be capable of cross-border, bi-national modeling, and will also serve as a regional transportation demand forecasting tool for Whatcom County.

4.4 Commercial Vehicle Operations

The following are projects and programs that influence Commercial Vehicle Operations (CVO) managed by transport agencies in Washington and British Columbia that have implications for moving cargo across the international border.

Commercial Vehicle Information Systems and Networks (CVISN): On a statewide basis, WSDOT is participating in a US Department of Transportation, Federal Motor Carrier Safety Administration (FMCSA) program called CVISN. “CVISN refers to the collection of information systems and communications networks that support CVO. These include information systems owned and operated by governments, motor carriers, and other stakeholders. FMCSA’s CVISN program is not trying to create

a new information system, but rather to create a way for existing and newly designed systems to exchange information through the use of standards and available communications infrastructure. The CVISN program provides a framework or “architecture” that will enable government agencies, the motor carrier industry, and other parties engaged in CVO safety assurance and regulation to exchange information and conduct business transactions electronically. The goal of the CVISN program is to improve the safety and efficiency of commercial vehicle operations”.⁵

The development of CVISN in Washington is a cooperative effort among the following organizations⁶:

- Washington State Patrol
- Washington State Department of Licensing
- Washington State Department of Transportation
- Federal Motor Carrier Safety Administration

WSDOT is implementing CVISN to enhance safety for drivers and trucks and to improve the operating efficiencies for both government agencies and motor carriers. The latest information on CVISN can be found at the WSDOT CVISN web site: <http://cvisn.wsdot.wa.gov>.

One aspect of this program is the sharing of regulatory, licensing, permitting, and safety information among the different state and federal agencies involved in the regulation of commercial vehicles. WSDOT has opened their system for the electronic exchange of this information with commercial vehicle regulatory authorities in British Columbia.

FOR MORE INFORMATION

CVISN Program Web Site
<http://www.jhuapl.edu/cvisn/>

WSDOT CVISN Program Web Site
<http://cvisn.wsdot.wa.gov/default.cfm>

Federal Motor Carrier Safety Administration
Web Site
<http://www.fmcsa.dot.gov>

⁵ Kim E. Richeson, Introductory Guide to CVISN (POR-99-7186) Preliminary Version P.2, February 2000

⁶ WSDOT CVISN web site: <http://cvisn.wsdot.wa.gov>

Another aspect of the program allows participating trucks with proper credentials and the correct weight to by-pass weigh stations. Automatic Vehicle Identification (AVI) transponders are used to identify trucks and provide a key to a roadside database to check credentials, while Weigh-In-Motion (WIM) sensors measure the weight of the truck. The transponders use Dedicated Short Range Communications (DSRC) to transmit information to readers at the roadside. DSRC is a short to medium range communications service that supports roadside-to-vehicle and vehicle-to-vehicle communication environments. DSRC provides very high data transfer rates in circumstances where minimizing latency in the communication link and isolating relatively small communication zones are important. In other words, DSRC can be used to quickly transmit information from a transponder on a moving vehicle to a roadside reader.

The data on commercial vehicle movements as they pass these weigh stations is transmitted to the CVISN database and is available to other users in near-real time. Thus, the deployment of transponder readers along I-5 and other locations provides a means to monitor the movement of commercial vehicles.

In addition, WSDOT has shared the weigh station bypass software with BC MoT to further enhance the sharing of information between the transportation agencies. BC MoT has deployed and is expanding the use of this electronic weigh station bypass program.

The electronic sharing of state and provincial commercial vehicle regulatory and safety information impacts cross border traffic by reducing the number of times that a truck could be required to stop at a weigh station or be subject for inspection by regulatory authorities in both Washington and British Columbia. While this program does not directly facilitate the faster movement of traffic at the border, it can reduce the overall trip time for participating commercial vehicles by reducing the need for vehicles to stop at weigh stations in Washington or British Columbia.

4.5 Border Agency Programs and Projects

There are a number of significant border processing initiatives underway by both the US CBP and Canadian CBSA to facilitate the safe, efficient movement of goods and people across the border. The key programs that have a potential impact on highway transportation movements are briefly described in the remainder of this subsection.

4.5.1 PROGRAMS IN THE UNITED STATES

CBP has and is implementing a wide range of systems and programs to improve border crossing efficiencies and security. The existing **Automated Commercial System (ACS)** is a suite of electronic computer systems that allows CBP to track, control, and process commercial goods imported into the United States. The suite includes an Automated Broker Interface (ABI) that provides for the electronic filing of required documentation by importers and brokers. Currently, over 98% of all entries are filed through ABI and of those over 70% are paperless. The Automated Manifest System provides for the electronic filing of manifests and is also used to notify CBP when an in-bond shipment has left the country. CBP uses the Automated Targeting System and Border Cargo Selectivity to conduct risk assessments of shipments before they reach the border using the information electronically filed in the ACS and from other sources. The Border Release Advanced Screening and Selectivity (BRASS) system tracks and releases highly repetitive shipments at land border locations. A CBP inspector scans a bar code into a personal computer, verifies that the bar code matches the invoice data, enters the quantity, and releases the cargo. The cargo release data is transmitted to ACS, which establishes an entry and the requirement for an entry summary, and provides ABI participants with release information. This and other programs allow for the rapid processing of repetitive and lower risk shipments.

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CBP is faced with significant growth in trade, increased demand for services and criminal use of emerging technology. These trends jeopardize its ability to protect the nation's borders and foster legitimate international trade. To meet this challenge, CBP has embarked on a **Customs Modernization** process that includes trade compliance, enforcement, administration and other critical business processes. The first initiative of the modernization program focuses on reengineering importing and exporting processes. **Automated Commercial Environment (ACE)** provides a fully automated information system to enable collection, processing and analysis of commercial import and export data. ACE is CBP's long-term vision for the future processing of goods into and out of the United States. ACE is a primary functional environment that will be composed of many specialized systems that will integrate elements of CBP's core process areas as they relate to this processing of goods. An anticipated feature of this system will be the ability to accept information from other government agencies on the location of cargo approaching the border. An example would be the passage of commercial vehicle at state and provincial weigh stations as captured under the CVISN program described above. Final deployment of ACE capabilities is scheduled for 2007.

International Trade Data System (ITDS) is a US federal government information technology initiative, utilizing ACE. Traders submit standard electronic data for imports/exports only once, via ACE. ACE distributes this to the pertinent federal agencies, thus serving as a government data collection/distribution facility (a "single window" system). The ACE / ITDS window promotes information sharing within a single system between all levels of government. This accelerates border clearance times, reduces costs, and cuts down on inefficient paper-based systems. Information on border movement statistics could be provided from this system to support local and regional planning activities.

Advance Commercial Information (ACI) is a major part of the US Customs Action Plan, which was launched in April 2000. ACI requires key data to be transmitted electronically before the goods arrive in the country. ACI Phase 1 requires marine cargo and conveyance information to be electronically transmitted to the CBP twenty-four hours prior to the loading of the cargo in the foreign port. Future phases of ACI will involve all transportation modes, with information transmitted to CBSA one hour prior to arrival for the Highway mode. Accordingly, all cargo shipments approaching the US border from Canada will be required to electronically file paperwork before they arrive at the US inspection station. This information will then be available to the inspector in the booth. This should reduce transaction times at the border.

Customs Trade Partnership Against Terrorism (C-TPAT) is a joint government-business initiative to build cooperative relationships that strengthen overall supply chain and border security. Through this initiative, CBP is asking businesses to ensure the integrity of their security practices and communicate their security guidelines to their business partners within the supply chain. Participants conduct a comprehensive self-assessment of supply chain security, complete a questionnaire, implement a program to enhance supply chain security and communicate C-TPAT guidelines to other companies in the supply chain. Participation in this collaborative initiative not only strengthens supply chain security, but also allows for a reduced number of inspections and expedited clearance at the border. This program will build a database of pre-screen importers and shippers. Shipments from this group will require less inspection time at the border.

Operation Safe Commerce (OSC) is a US federally funded, public-private initiative, aimed at providing a test-bed for evaluating container security techniques – from the point of origin, through the supply chain, and to the point of destination – while also facilitating the efficient cross-border movement of legitimate commerce. OSC will evaluate security techniques at the ports of New York/New Jersey, Los Angeles/Long Beach and Seattle/Tacoma and is funded through grants provided by the US Transportation Security Administration. The ability to monitor shipments through the Ports of Seattle and Tacoma will be part of this effort.

The **Container Security Initiative (CSI)** was conceived in early 2002, to “push the borders out” and identify and examine maritime containers that pose a risk for terrorism at foreign ports before they are shipped to the United States. CSI initially focused on implementing the program at the top twenty foreign ports, but as CSI has evolved, CBP hopes to expand the program to additional ports based on volume, location and strategic concerns. Strong support from countries on the European, Asian and African continents ensure that CSI will continue to expand to ports in those areas.

CBP is also testing the use of electronic cargo seals (eSeals) that are equipped with radio frequency identification capabilities to signal if tampering has occurred. Several of these seals use the same AVI protocol used by the CVISN program. WSDOT is participating in these operational tests.

4.5.2 PROGRAMS IN CANADA

Canada Border Services Agency (CBSA) offers electronic data interchange (EDI) systems that allow importers and brokers to file customs accounting documents electronically. The Customs Automated Data Exchange (CADEX) was the first EDI system offered for Canadian customs operations. CADEX lets import data move both ways between CBSA and CADEX users, who can use anything from personal computer systems to large corporate mainframes. As of January 2002, 97% of the total commercial entry documents that CBSA processed are transmitted by CADEX. Users may include customs brokers, importers, automotive manufacturers or courier companies⁷. This data is available at the Canadian inspection booths and does help to improve transaction time.

The **Accelerated Commercial Release Operations System (ACROSS)** builds upon these EDI systems to streamline the importation of goods into Canada. Under ACROSS, importers and brokers exchange information electronically with the CBSA and thereby removing the requirement to present hard copy release packages, subject to certain limitations. ACROSS also provides the CBSA with a tool for ensuring that only high-risk imports are selected for compliance verification. The targeting system can verify a wide variety of information such as importer numbers, carrier codes, and countries of origin. This allows for greater enforcement capabilities and a faster release process for low-risk shipments⁸.

The **Customs Self Assessment (CSA)** program provides approved importers the benefits of a streamlined accounting and payment process for all imported goods. The streamlined accounting and payment process ends the need for importers to maintain separate and costly customs processes, allowing them to use their own business systems.

The CSA program also gives approved importers, approved carriers, and registered drivers the benefits of a streamlined clearance option for CSA eligible goods. The streamlined clearance process ends the need for transactional transmissions of data related to eligible goods. This allows for the clearance of goods based on the identification of the approved importer, approved carrier, and registered driver⁹. Importers and carriers wishing to participate in the program are subject to a business practice and security review.

Partners in Protection (PIP) is designed to enlist the co-operation of private industry in efforts to enhance border security, combat organized crime and terrorism, increase awareness of customs compliance issues, and help detect and prevent contraband smuggling. Participants are to provide a self-assessment of their security systems. This self-assessment is used by CBSA to identify any

⁷ Source: Canada Business Service Center website:

<http://www.infoentrepreneurs.org/english/display.cfm?docid=/Regional/federal/fedbis.nsf/894580d8458979828525641b006acb81/b51bc4aee d1db9f48525627c004a8e8e?OpenDocument>, June, 2004

⁸ Source: CBSA website: <http://www.cbsa-asfc.gc.ca/eservices/ogd/factsheet-e.html#introduction>, June, 2004

⁹ Source: CBSA website: <http://www.cbsa-asfc.gc.ca/import/csa/menu-e.html>, June 2004

weaknesses in security processes and will enable CBSA to help participants address any deficiencies. Participants are also required to sign a partnership agreement with CBSA. Both CSA and PIP are similar in intent to the US Customs Trade Partnership Against Terrorism (C-TPAT) program.

4.5.3 JOINT UNITED STATES AND CANADA PROGRAMS

The **Free and Secure Trade (FAST)** program is a joint initiative between both countries. It builds on Canada’s Customs Self-Assessment (CSA) program for principles of pre-approval and self-assessment, and on Partners in Protection (PIP) for increased security measures, and offers expedited clearance of low-risk carriers and importers enrolled in C-TPAT or PIP. FAST is implemented at the Pacific Highway Crossing in Blaine, Washington. A depiction of the program features is in Exhibit 4-3 below.

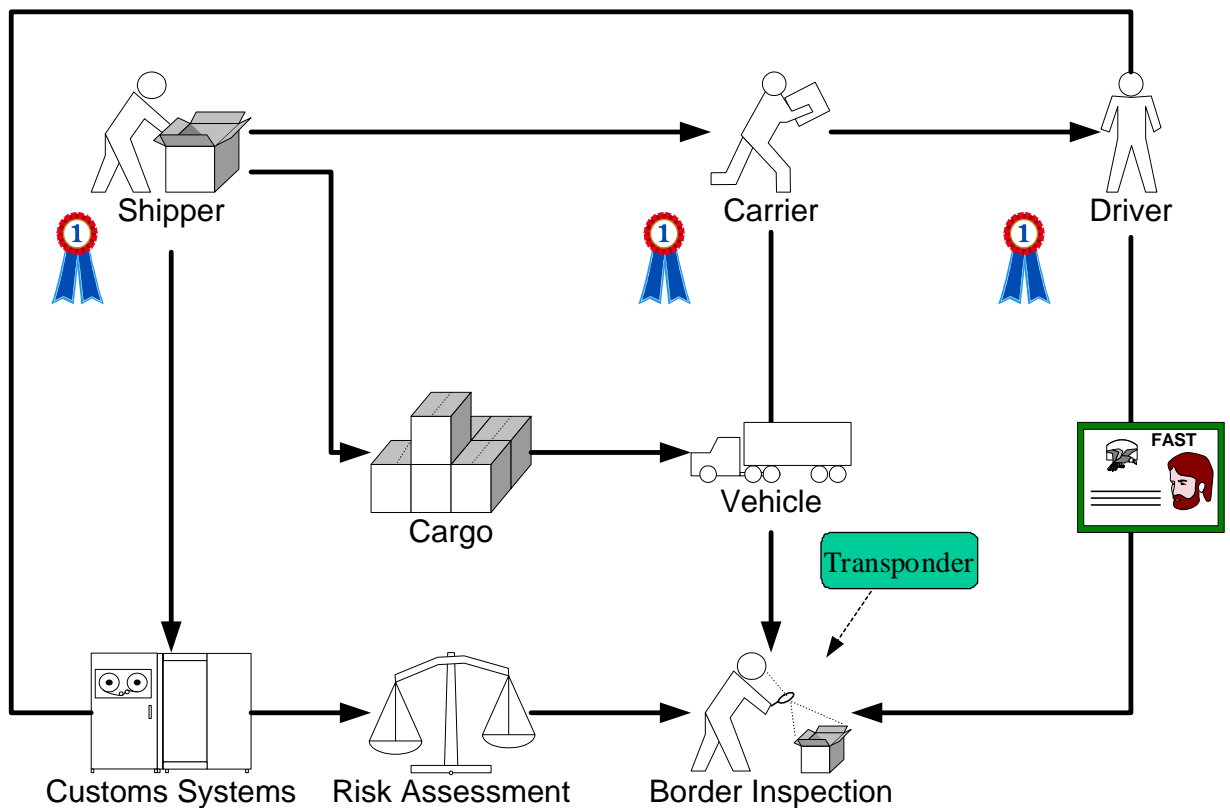


Exhibit 4-3: FAST and the Trade Flow

Under this program, the shipper, carriers, and drivers are pre-screened and added to border agency systems as trusted shippers, carriers and drivers. Carriers are issued electronic radio identification devices called transponders that are read by a radio frequency wireless connection at the inspection booth and provide an automated link back to the appropriate border inspection agency vehicle databases. Drivers are issued FAST electronic identification cards that can be read at the inspection booth using the same radio frequency technology and linked back the appropriate border inspection agency driver databases. For each movement, the shipper electronically files the proper paper work and a risk assessment (using ACROSS, Automated Targeting System and Border Cargo Selectivity as appropriate) is performed by the relevant border agency. The assessment and cargo documentation is electronically available to the inspector at the booth. Thus, the inspector

has electronic access to information on all three components of the movement – cargo, vehicle and driver. Processing times at the border are reduced. Plans are underway to implement dedicated approach lanes to FAST-only inspection booths for FAST compliant vehicles that will allow them to bypass the normal truck queue. These lanes encourage participation in the FAST program.

NEXUS is a joint US and Canadian program for frequent travelers. The NEXUS program allows pre-screened, low risk travelers to cross borders in dedicated lanes without routine customs and immigration questioning. Individuals must be approved by both Canada and the US and they receive an identification card for use at the border. NEXUS is currently in operation at the Peace Arch/Douglas, Pacific Highway and Point Roberts crossings. Plans are underway to implement dedicated approach lanes to NEXUS-only inspection booths that will allow NEXUS program participants to bypass the normal passenger vehicle queue.

4.5.4 SUMMARY OF BORDER AGENCIES PROGRAMS AND PROJECTS

Both countries have and are continuing to invest in electronic data interchange (EDI) systems that allow all participants in the trade flow to electronically submit any required documentation. In the near term, that all shipments arriving at the border will require the advanced, electronic submittal of required documentation.

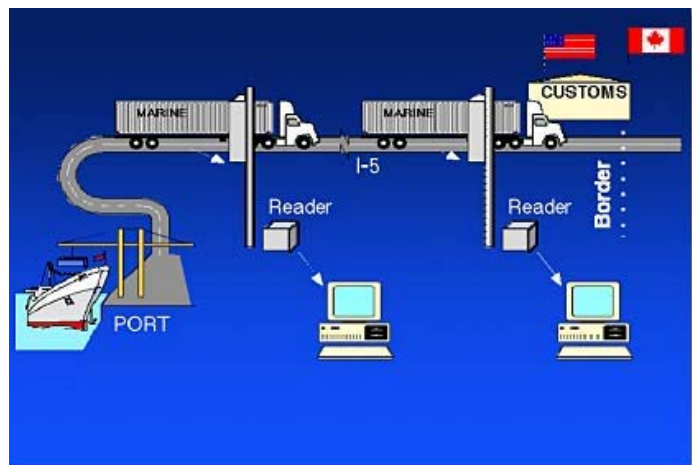
The emerging EDI systems will include the ability to accept information from other government agencies on the location of vehicles and cargo approaching the border. Both countries have expanded the use of automated risk assessment tools to help determine if a shipment will be inspected more closely when it arrives at the border. Location information would be provided by transport agencies reading CVISN transponders and eSeals at weigh stations, seaport exits, and other locations. The information on the location of vehicles and cargos approaching the border could be part of the risk assessment process.

Together, both border agencies are promoting the concept of pre-screened importers, carriers and drivers under the joint FAST program. Combined with the electronic filing of requirement documentation, the FAST program electronically connects the three elements of a goods movement – cargo, vehicle and driver – together through the use of transponder technology. This “approved” shipment for lower risk movements should decrease processing time at the border. Given the high percentage of empty trucks crossing the border in both directions, there may be an opportunity to facilitate the movement of empties or other low risk repetitive movements.

4.6 Joint Border and Transportation Agency Initiatives

4.6.1 IN BOND CONTAINER PROJECT (WSDOT ITS-CVO PROGRAM)

In-bond cargo movements involve the transshipment of goods arriving at a US port that are then directly shipped to Canada or Mexico. The goods are never actually imported into the US. The shipper is required to post a financial bond to guarantee the



shipment of the cargo out of the US. Once the cargo is out of the US, the shipper must request a release of the bond.

Phase I of this WSDOT ITS-CVO project enables Canadian-bound containers arriving at the marine ports of Seattle and Tacoma to clear their bonds at the border through the use of electronic AVI truck transponders and AVI readers along I-5. This pre-arrival information system provides both border inspection agencies with shipment information in advance of the truck's arrival. Once the shipment leaves the US, another AVI reader detects its departure. The system then uses the Automated Manifest System to electronically request the release of the bond from US CBP. The responsible carrier is simultaneously notified of the exportation. This automatic process helps to eliminate ongoing problems associated with "lost" in-bond shipments and paperwork errors.

Phase II of the project is deploying an analogous system for southbound cross-border movements. The completion of a two-way system will accelerate the abilities of US and Canadian inspection agencies to integrate pre-arrival systems, and lead to information exchange, which may allow one nation's export data to become the other nation's import data¹⁰.

4.6.2 TRADE CORRIDOR OPERATING SYSTEM (TCOS)

The Trade Corridor Operating Systems (TCOS) information management system expanded the in-bond project to support and integrate Automatic Vehicle Identification (AVI) transponder reads along the entire I-5 corridor from Tacoma, Washington to Vancouver, BC. TCOS uses secure Internet site for the entry and exchange of information among shippers, transport agencies, and border inspection agencies. All tracking and data functions can be viewed and managed over the Internet. The security features of the system strictly define what features, functions and data are accessible by each individual user.

AVI transponders are used to track in-bond containers trucked from the ports of Seattle or Tacoma into Canada. The transponders, which are the same that are used for the CVISN program, are installed in the cab of registered trucks. The system can also read eSeal tags that are described in more detail below. The system utilizes the unique tag serial number to reference shipment, carrier, and vehicle credentials.

AVI readers are installed at the exit gates of the APL terminal at the Port of Seattle and of the Maersk Sealand terminal at the Port of Tacoma. As the

commercial vehicle exits, these gate systems detect the tag, and software references the container and in-bond information and posts it on the TCOS web site. The system also alerts both border inspection and transportation agencies that a container has left the port and is heading north. AVI readers installed at weigh stations along I-5 provide additional en-route information.

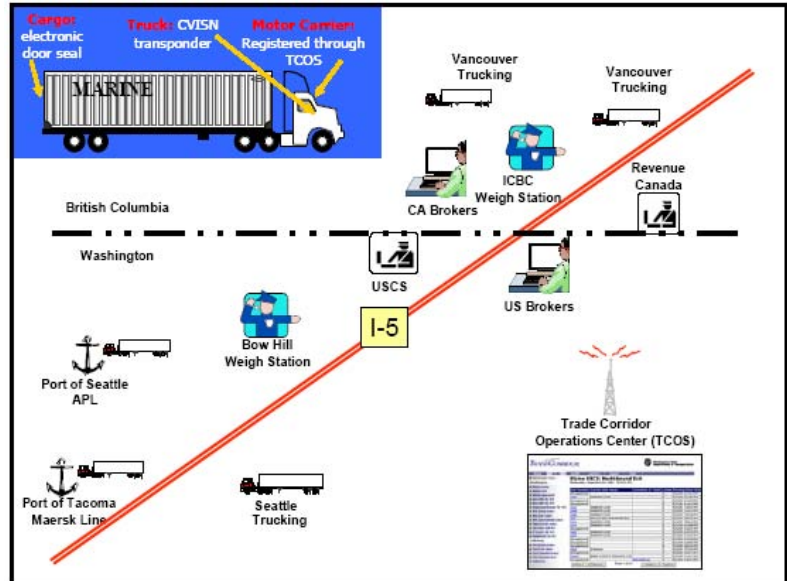


Exhibit 4-4: System Overview¹

¹⁰ WCOG, <http://www.wcog.org/imtc/itsphase2.html>

An advanced AVI reader installed a quarter of a mile south of the border on SR 543 gives US CBP inspectors at the Pacific Highway commercial crossing sufficient time to preview the truck's in-bond transaction status before it arrives. Access to this information is through TCOS and not the internal CBP systems. A final reader at the border automatically transmits an electronic transaction to the US Automated Manifest System to clear the bond on the shipment and marks the cargo as exported.

In the future, positional information could be directly electronically transmitted to the systems of both border inspection agencies for use in their risk assessment and inspection processes. TCOS provides an established mechanism for the transmittal of this type of information.

4.6.3 ELECTRONIC SEALS

Electronic freight container seals (eSeals) are radio frequency devices used to "seal" freight containers in place of traditional locking devices. The eSeals transmit a unique ID number and tamper indication message to roadside readers, indicating whether tampering has occurred with a specific cargo container.

WSDOT is conducting an eSeal operational test that to determine whether installation of these devices could improve freight tracking and container integrity. For the operational test, the seals were affixed to containers in Japan, shipped through Seattle, and cleared by US and Canadian customs agencies at the Pacific Highway border crossing.

The eSeal test included the development and deployment of a new disposable electronic

seal system. This system was comprised of electronic container seals; portable hand-held eSeal readers; a stationary eSeal reader

located at the US CBP approach at the Pacific Highway commercial vehicle border crossing; and dedicated AVI truck transponder readers at three sites.

The container eSeal reads were captured by TCOS and thus provided for complete visibility of the truck container movements along the trade corridor.

The primary goal of this system is to validate the audit trail for seal status through the supply chain of a container shipment. This validation process includes determining the integrity of the eSeal and recording the time and place of each seal transaction (i.e., each location where the eSeal was "read" by a device). This is accomplished remotely by reader antennas or by humans with hand-held readers in a fashion similar to the manual seal validation process.

The TCOS and eSeal joint programs provide a model for how transportation and border inspection agencies can work together to facilitate the movement of vehicles across the border within the context of their respective missions.

5. PROBLEM ANALYSIS

Maintaining the efficient and secure flow of people and goods between Washington and British Columbia is vital to the economy of both countries. Over the years, the border and transportation

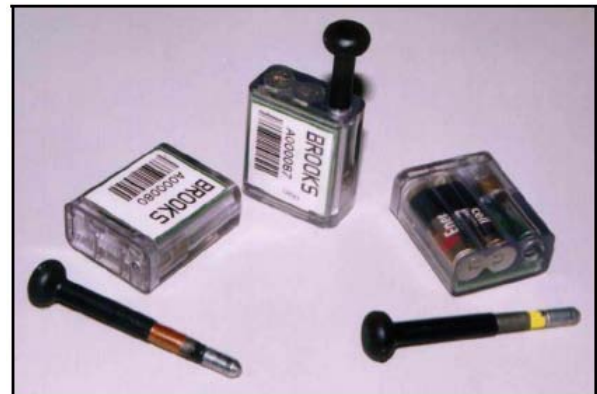


Exhibit 4-5: eSeal Hardware

agencies of both countries have worked closely together to examine and develop solutions for congestion at the border. Along the Washington – British Columbia border, a wide range of solutions to improve the efficiency of the border crossing process have been planned and implemented. These solutions include:

1. **Adding More Staff:** Border agencies have increased the number of staff at the border which results in the ability to process more vehicles.
2. **Building More Booths:** As border stations have been upgraded, additional inspection booths and lanes have been added.
3. **Improving the Physical Layout:** The roadways approaching the border stations have been and are being expanded and updated to provide segregated lanes for cars and trucks and more queuing space. In addition, designated lanes for participants in trusted traveler and carrier programs are planned. (These are the NEXUS and FAST programs described above.)
4. **Providing More Information:** Both border agencies have implemented and are improving automated systems for the electronic filing and exchange of required documentation for the movement of cargo, vehicles and drivers across the border. This shipment data and additional information is used to assess the relative risk of cargo movements and is provided directly to inspectors at the border. These systems reduce the amount of paper work required for crossing the border and reduce transaction times at border inspection points.
5. **Implementing Processing Efficiencies:** Border agencies have automated the capture of information through the use of license plate readers, radiation detectors, and a non-intrusive gamma-ray imaging system that produces radiographic images used in the evaluation of the contents of trucks. The FAST and NEXUS programs further reduce transaction times by providing electronic clearance capabilities.

The first three items focus on physical improvements, which have been a significant component of the cooperative action between border inspection agencies, transportation agencies and other stakeholders on both sides of the border. Beyond these physical improvements, the challenge faced by transportation agencies is finding appropriate ways to integrate into the processes and procedures that are demanded by border security concerns.

The previous sections of this report have focused on presenting the current operating conditions at the border with regards to the various agencies, physical infrastructure, and technology projects they have developed to improve the secure flow of people and goods over the border. A key step in this border systems assessment process is to identify “gaps” in the existing and planned border technology projects and programs. This analysis points to three primary areas where the transport agencies can deploy technology to improve conditions at the border area. These include:

- **Traveler Information:** Transportation agencies can be of further assistance through the capture and dissemination of travel conditions to the general public, commercial vehicles, shippers, and the border agencies. Providing traveler information is a key focus of both WSDOT and BC MoT as part of their core mission. The border agencies provide this information as a customer service but lack the infrastructure and systems to provide comprehensive information away from the border itself. The transportation agencies have worked together successfully to deploy the Northbound and Southbound ATIS at the Peace Arch/Douglas and Pacific Highway border crossings. These systems could be expanded to other primary crossings.
- **Construction Mitigation:** As described above, there are a significant number of roadway and facility projects planned. Each of these construction projects will impact travel conditions at and approaching the border. Focused traveler information can help

address this construction-spawned congestion by providing travelers with options for alternate routes and advance notification of delays.

- **Commercial Vehicle Operations (CVO):** Transportation agencies can be of further assistance through the capture and dissemination of travel conditions to the general public, commercial vehicles, shippers, and the border agencies. In their capacity of regulating commercial vehicles, transport agencies could provide information on vehicle movements. The WSDOT CVISN and the TCOS programs provide a ready platform for providing the border inspection agencies with information on the movement of vehicles as they approach the border. The key is to find acceptable means to electronically transmit this information to the border agencies.

The following subsections analyze the problems and issues within these areas, to the extent of the transport agencies' ability to provide assistance.

5.1 Traveler Information

Providing traveler information within their respective jurisdictions has been a major focus of both WSDOT and BC MoT. The border inspection agencies recognize the value of providing traveler information in terms of customer service. However, it is not part of their primary mission. The current ATIS deployments for the Peace Arch/Douglas and Pacific Highway border crossings will help to improve overall travel times by providing wait time information to travelers before they reach the crossing. However, several gaps and unmet needs have been identified:

- The border ATIS does not provide information for the Lynden/Aldergrove and Sumas/Huntingdon crossings.
- The ATIS currently cannot differentiate between wait times for passenger vehicles and wait times for commercial vehicles.
- The ATIS currently does not provide a wait time estimate for FAST and NEXUS participants. This information, shown in contrast with wait times for traffic in the "general" lanes would be motivational in encouraging additional participation in those programs.
- Although a cooperative project between the US and Canada, the northbound and southbound systems are not currently using the same software applications or presenting a single border crossing information solution. This could allow simplified shared access to the information distribution methods, and would also have the benefit of streamlining the cross-border system to appear as "one" system to travelers.

5.2 Construction Mitigation

As identified in Section 4.1, a considerable number of major construction projects are planned at or approaching the border. The schedules of several projects have been moved forward as part of preparation for the 2010 Winter Olympics in British Columbia. The IMTC maintains a coordinated construction schedule for planned projects on both sides of the border that includes which border crossing will likely be impacted by any closures or delays. The following issues have been identified:

- A comprehensive plan, to address congestion and routing options related to upcoming major construction projects, has not been developed.
- En-route real-time construction delay information is not currently provided to travelers.

- The current plans for the construction projects generally do not include the deployment of vehicle sensors or cameras to monitor traffic flow during construction. This information could be used to provide anticipated delay information and alternative routes via the Internet, 511, Highway Advisory Radio, and DMSs.
- Construction projects on key roadways that approach the border may offer good opportunities to coordinate with the deployment of sensors, cameras and related communications infrastructure without impacting the roadway a second time. Several of the projects include provisions for roadside infrastructure. However, other projects are still in the planning and environmental assessment stages and have not made final decisions on the deployment of this transportation technology.

5.3 Commercial Vehicle Operations

5.3.1 SHIPMENT TRACKING

The in-bond container and eSeal field operational tests have demonstrated the ability to track the movements of participating trucks as they travel from the ports to the border crossing. The ability to track vehicle movements in this way provides information on the amount of time taken for the vehicle arrive at locations in near-real time. If a vehicle takes an unexpected amount of time between points or the eSeal signals that tampering has occurred, this may indicate that a breach of security has occurred.

While access to TCOS is available to both border inspection agencies, no direct interface to border agency systems to electronically transmit this freight movement data exists. Accordingly, the information is not directly available for threat assessments or to the inspectors at the border. While US CBP is currently undergoing a "modernization" to launch the Automated Commercial Environment (ACE), the ability of this system to accept third party information on vehicle movements is not fully defined at this point.

5.3.2 PROGRAM PARTICIPATION

The implementation of the FAST program along the US-Canadian border offers the opportunity to pre-screened and low risk carriers, drivers, importers and cargos for quicker processing. However, the participants are required to be registered in the program and the cargo must be classified as a "low-risk" transactions. The deployment of FAST along the Washington-British Columbia border cannot succeed unless there are an adequate number of participants.

Since the success of the program is directly tied to the number of participants, methods of targeted recruitment directed at those carriers and importers who have already demonstrated a commitment to security through the Canadian PIP and/or US C-TPAT programs should be identified.

5.3.3 TECHNOLOGY COMPATIBILITY

Electronic screening programs are dependent upon use of transponders installed on the windshield of the truck. The transponders are used to store identification and credentials information specific to the truck and its cargo. FAST and CVISN are two programs that rely on truck transponder data to electronically identify and pre-clear vehicles at the border and at weigh stations, respectively. The transponders use Dedicated Short Range Communications (DSRC) to transmit information to readers at the roadside. DSRC provides very high data transfer rates in circumstances where minimizing latency in the communication link and isolating relatively small communication zones are

important. In other words, DSRC can be used to quickly transmit information from a transponder on a moving vehicle to a roadside reader.

Communications protocols define the low-level commands used to control transponders and enable message transfer. Currently, the CVISN and FAST transponders use two different protocols: eGo™ and Time Division Multiple Access (TDMA). The result is that roadside readers for CVISN cannot read FAST transponders and vice versa. Although these two systems were not intended to provide cross-communication capabilities, the lack of compatibility makes the electronic capture of movement information from differently equipped vehicles impossible. However, the supplier of this equipment does manufacture dual protocol readers that could overcome this technical issue.

5.3.4 LACK OF HISTORICAL INFORMATION

While a number of efforts have collected data about queue lengths and border transit times at the Cascade Gateway border crossings, these studies have used human observers over discrete periods of time. Long-term, continuous, automatic data collection about the movement of both trucks and passenger vehicles over the border and associate border crossing times would provide the daily and seasonal information that the periodic data collection efforts cannot provide. Such continuous data may be used to guide planning decisions involving border infrastructure, assist the border enforcement agencies in resource allocation and operational decisions, and collect information on border delays. Currently, the Southbound and Northbound ATIS cannot differentiate between trucks and passenger vehicle data and the information is not being consolidated into a comprehensive border crossing database.

5.3.5 INFORMATION SHARING

Information sharing capabilities among agencies has been greatly enhanced with the availability of high-bandwidth data transmission technology. Electronic Data Interface (EDI) is the computer-to-computer direct exchange of standardized information, generally related to transport, commerce, or administration. For example, trade partners can use EDI to establish a connection with automated electronic filing systems of both border agencies.

Development of an EDI link that would enable the direct exchange of information between transportation agencies and border agencies has not been undertaken. State DOTs will have some level of access to the new Automated Commercial Environment system, but it is not known exactly what types of information will available to the State DOT or sent to CBP. Establishing electronic data exchange would enable many applications, including the ability to provide truck movement data from TCOS to the border agencies.

6. RECOMMENDATIONS FOR FUTURE PROJECTS

This section builds on the previous sections to present project recommendations for WSDOT to leverage the existing border crossing technologies in order to bridge the issues and problems identified in Section 5.

6.1 Traveler Information

Better information about congestion and travel times, and good connector routes could potentially divert traffic away from Peace Arch/Douglas and Pacific Highway during congested periods. The Whatcom Council of Government's Cross Border Trade and Travel Study noted that those travelers who are already choosing a route to avoid congestion tend to do so at Pacific Highway or

Lynden/Aldergrove. From the origin-destination data collected in the study, there appears to be an opportunity to encourage a more integrated approach to using the Peace Arch/Douglas, Pacific Highway, Lynden/Aldergrove and Sumas/Huntingdon crossings as a system for routing traffic to the least-congested crossing.

The following projects address the need to provide congestion, wait time, and road closure information to Cascade Gateway travelers in order to enable them to make informed decisions about when and where to cross the border.

Cross Border ATIS Expansion: This project would expand the provision of traveler information to all four border crossings in both directions and include separate coverage of both automobile and commercial vehicle wait times. In addition, the project would develop the mechanisms for the coordinated sharing of traveler information between WSDOT and BC MoT ATIS projects. Additional dynamic message signs, cameras, highway advisory radios, expanded 511 coverage and Internet sites would be considered. The exhibit below presents the existing devices along with what a fully expanded ATIS might look like.

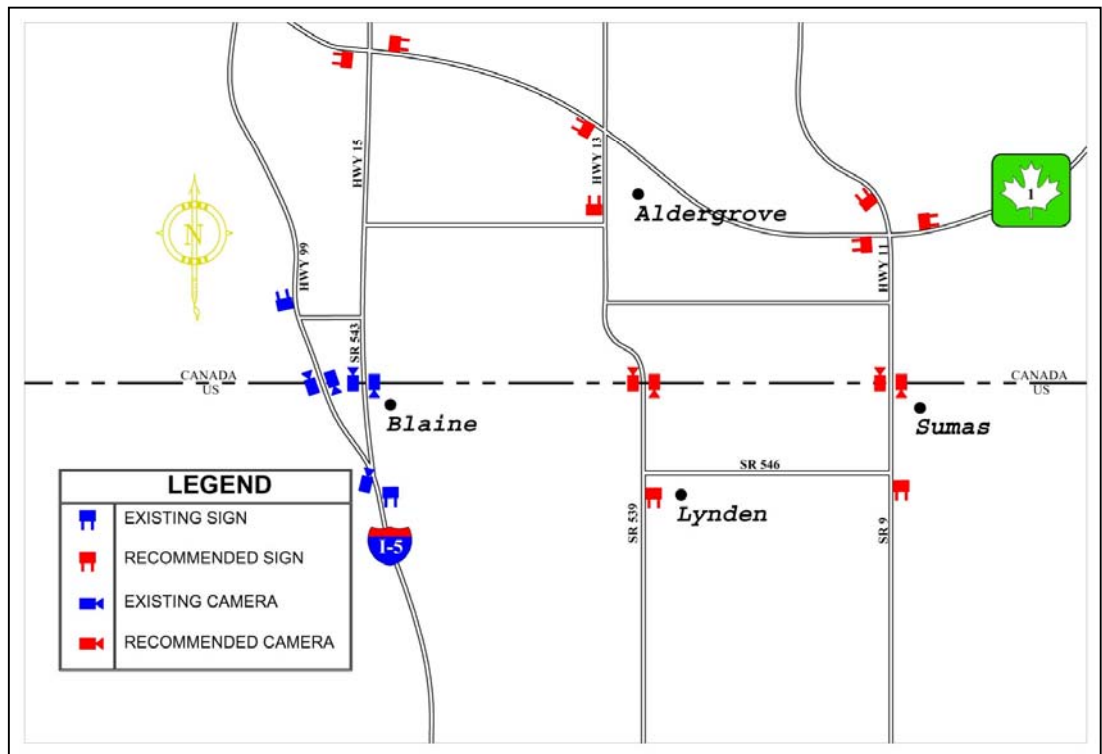


Exhibit 6-1: ATIS Existing and Proposed Devices

Cross Border Data Archive: This project would develop a consolidated electronic data archive of border crossing movement information from available sources. The northbound and southbound ATIS would be the primary source of data archived under this effort. Volume, vehicle classification and travel time information would be gathered for trend tracking and future analysis. As links to the border agency databases are made available, additional information on passenger vehicle, truck and goods aggregated movements could be added.

6.2 Construction Mitigation

A recommended project would install and operate vehicle detection, traffic cameras, HAR and DMS along SR 543 and SR 539 in advance of the major construction that is planned along these corridors. This information gathered and disseminated by these devices would be used to provide advance notification to travelers of backups, delays and alternate routes. These efforts would be complementary to the recommendations for an expanded ATIS described above.

6.3 Commercial Vehicle Operations

The following projects are recommendations for enhancements to existing CVO projects and programs. These recommendations address data collection, information sharing, and program participation.

Expanded Cross Border CVISN Deployment: WSDOT is leading the deployment of CVISN in Washington to enhance safety for drivers and trucks and to improve the operating efficiencies for both government agencies and motor carriers. WSDOT has extended their implementation to provide a link to parallel agencies in British Columbia. This project would continue the expansion of CVISN across the border by deploying field equipment at weigh stations in British Columbia, equipping more vehicles with AVI transponders, and facilitating the electronic sharing of information between commercial vehicle regulatory agencies on both sides of the border.

Cross Border Commercial Vehicle Movement Data Collection: This project would deploy additional field equipment to capture commercial vehicle movement information on the highways approaching the border. The field installations would include WIM sensors to capture weight and vehicle classification information and AVI transponder readers to record the movement of individual vehicles. This information would be aggregated to preserve individual truck movement privacy and provide detailed, continuous information on commercial vehicle movements. The deployment should also include the installation of dual protocol AVI transponder readers to capture information from trucks equipped with CVISN and FAST transponders. This deployment should be coordinated with the expand coverage of the ATIS.

Expedited Crossing for “Empties”: A 2000 survey of border crossing traffic revealed that there are a significant percentage of empty commercial vehicles crossing the border in both directions. The northbound percentages are even higher than the southbound percentages. From a border clearance and security standpoint, the empty commercial vehicle represent a somewhat reduced threat. An effort to expedite the movement of empty commercial vehicles should result in a reduction of congestion for all commercial movements. This project would enable empty trucks equipped with a FAST transponder, driven by FAST registered drivers, and operated by FAST pre-approved carriers to use dedicated FAST lanes.

In additional, consideration should be given to the use of the northbound Lynden/Aldergrove border crossing for FAST enrolled empties until the scheduled improvements at SR 543 are completed. These empty trucks would be diverted from Pacific Highway and thus reduce overall border congestion now and during construction on SR 543.

The FAST transponder would be used to track the vehicle's movement and to verify the vehicle's weight, possibly at the Bow Hill weigh station through the use of dual protocol AVI transponder readers.

Border and Transportation Agency Interface: Although initiatives such as FAST have opened the lines of communication between the transportation and border agencies, an electronic gateway for the exchange information between these two groups has not been established. The recommended project would expand upon previous data exchange efforts between the border agencies and WSDOT-sponsored efforts such as TCOS. The project would consist of a series of initiatives to expand the exchange of commercial vehicle movement information with Border Agency systems. For example, data gathered on cargo movements at weigh stations and ports through the reading of transponders on trucks and containers could be electronically transmitted to Border Agency systems to provide tracking information. This project would evolve based upon the planned modernization of the Border Agency systems to accept information from transport agencies, i.e., the linking of transport agencies to ACE.

FAST "Matchmaking": This project would investigate the feasibility of linking FAST-approved drivers and carriers with FAST shipments "on the fly" when the shipment arrives at the freight terminals and ports, potentially expanding usage of the FAST program. This assumes that some FAST-approved shipments arrive at freight terminals without a FAST driver/carrier already assigned to transport them.

eSeals Operational Tests: It is recommended that WSDOT continue participation in the testing and evaluation of eSeals, with the goal of expanding the program to include additional carriers and goods movements.

In-Bond Container Program: It is recommended that WSDOT continue with the northbound and southbound in-bond container pre-arrival information system, and investigate integrating with other CVO systems, including Weigh-In-Motion technology and driver pre-approval.

Targeted "Trusted Movement" Recruitment: The implementation of the FAST program along the US-Canadian border offers the opportunity to pre-screen carrier, driver, importer and cargo for quicker processing. However, the participants are required to be registered in the program and the cargo must be classified as a "low-risk" transactions. The deployment of FAST along the Washington - British Columbia border will not be able to mitigate commercial vehicle congestion unless there are an adequate number of participants. This project would work with the border agencies to first identify potential participants and cargo movements that may qualify for FAST, and then recruit them to join the program. While this project does not involve technology, the benefit to the transportation agencies would be the reduction in commercial vehicle queues at the border.

7. RECOMMENDED CONCEPT OF OPERATIONS

A concept of operations provides a description of current and future relationships among transportation, border security, and safety agencies in a given region, in order to maximize efficient operations for all agencies and to provide the best service to the public. A concept of operations defines the relationships among organizations that are required for the deployment and operation of a particular program area such as traveler information or commercial vehicle operations. The combination of existing, planned and recommended projects and programs is used define how transportation technology can be integrated into the context of the border

Relationships among agencies embody two main components: 1) the agency-to-agency relationship defines what roles and responsibilities each agency has, and 2) the kinds of information exchange that occur between each agency. Various types of relationships may occur between

partnering agencies as part of an operational concept. The types of relationships begin at no interaction, operation of the agency's own devices, and move through consultation and cooperation, where joint efforts are undertaken but electronic information is not exchanged. Information and control sharing describe increasing levels of electronic information exchange and shared device or system control.

Along with these relationship types are associated information types that are typical for agency-to-agency exchange. Five primary types of information exchanges may be identified:

1. **Data:** The dissemination of data gathered from one party's field devices or system to another party. Data can include, but is not limited to, vehicle movement, weather, transponder reads, etc.
2. **Video:** The dissemination of live video and still images from one party's field cameras to another party.
3. **Status:** The ability for one party to monitor another party's field devices, and receive such information as current maintenance status, current DMS message, etc.
4. **Request:** The ability for one party to solicit either data or a command change, such as truck manifest data, from another party.
5. **Control:** The ability for one party to control another party's field devices. Control can include but is not limited to, changing DMS messaging or camera control.

As discussed throughout the previous sections of the report, the transport agencies can best integrate with border agency activities in the areas of traveler information and commercial vehicle operations. A recommended concept of operations for each area is described below.

7.1 Traveler Information Concept of Operations

For Traveler Information, the focus is on transportation agencies gathering data on vehicle movements and then providing consolidated and processed information to help travelers, both in trucks and cars, make better decisions. The concept of operations is illustrated in the Exhibit 7-1. Traveler information is exchanged among the WSDOT Bellingham TMC, WSDOT Statewide Transportation Operations Center, City of Bellingham TMC, border crossing Advanced Traveler Information Systems (ATIS) field devices, and the BC MoT. The primary source of traveler information to the general public is through the traveler information web sites, WSDOT 511, BC MoT traveler information phone, and other electronic message dissemination methods provided through the WSDOT Statewide Transportation Operations Center and BC MoT. Providing information on construction delays and closures is also considered part of the Traveler Information concept of operations. Additional details are provided in the table provided in Exhibit 7-2.

Washington State Department of Transportation
 TRANSPORTATION TECHNOLOGY AT THE WASHINGTON-BRITISH COLUMBIA INTERNATIONAL BORDER

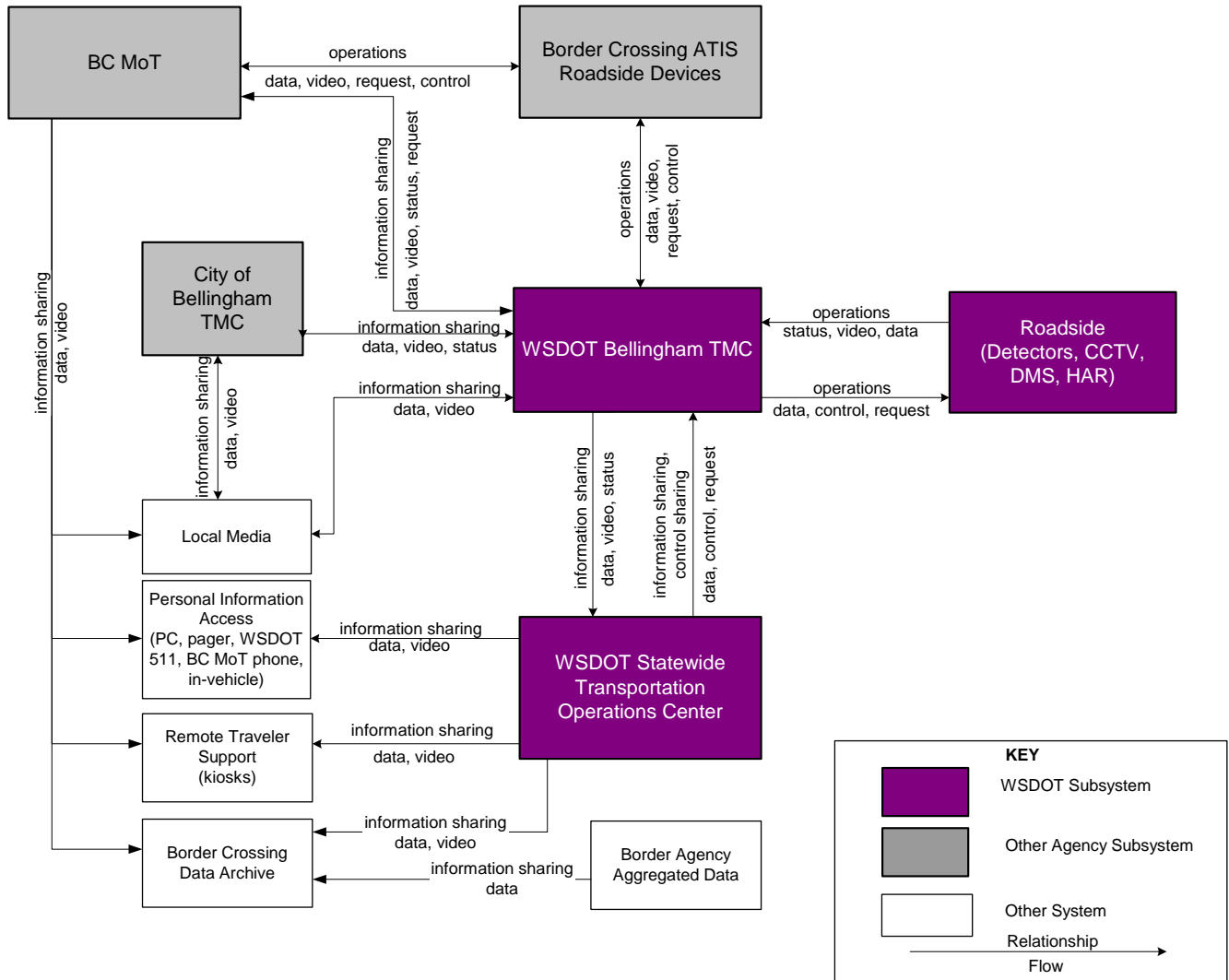


Exhibit 7-1: Border Traveler Information Operational Concept

Agency	Description of Relationship
Border Crossing ATIS Devices	The cross-border ATIS devices (detectors, cameras, DMS, HAR) are operated by WSDOT and the BC MoT. The diagram shows both agencies having access to the roadside devices.
BC MoT	In addition to operating the southbound border ATIS, BC MoT is shown sharing information with the WSDOT Bellingham TMC. Currently, an electronic link between the agencies is not established. BC MoT does have a web site and a telephone information line that provides border wait times. Camera images are available on the web
WSDOT Statewide Transportation Operations Center	The WSDOT Statewide Transportation Operations Center collects traveler information (camera images, construction information, closures, congestion, etc.) and disseminates it via the WSDOT web site and 511.
Local Media	A larger audience for WSDOT CCTV camera images and road closure alerts can often be reached via local television news channels.
Bellingham area TMCs	The WSDOT Bellingham TMC and City of Bellingham TMC work together to provide more complete traveler information to citizens, including camera images and road closures.
Border Agency Aggregate Data	Border agencies would aggregate appropriate vehicle and goods movement data for incorporation into the border crossing data archive.
Border Crossing Data Archive	Data on border movements and wait times is archived in a consolidated database for tracking trends and analysis.
WSDOT Roadside	The WSDOT TMC in Bellingham controls DMS and HAR installed at the roadside in the area.

Exhibit 7-2: Traveler Information: Summary of Agency Relationships

7.2 Commercial Vehicle Operations and Border Crossings

Regulatory agencies at federal and state/provincial levels are concerned with three components of goods transport: 1) commercial vehicle driver, 2) commercial vehicle, and 3) cargo. The operational concept for the exchange of information about these three components among agencies and movers of goods is depicted in the diagram on the next page (Exhibit 7-3). The primary challenge remains the free exchange of electronic information between the transportation and border crossing systems. Efforts are underway to provide for better interoperability in the future. This concept of operations represents a construct that would facilitate this exchange. Subsystems are not shaded to show WSDOT ownership in this diagram, since the majority of the represented subsystems are outside the control of WSDOT. Additional details are provided in the table found in Exhibit 7-4.

Washington State Department of Transportation
 TRANSPORTATION TECHNOLOGY AT THE WASHINGTON-BRITISH COLUMBIA INTERNATIONAL BORDER

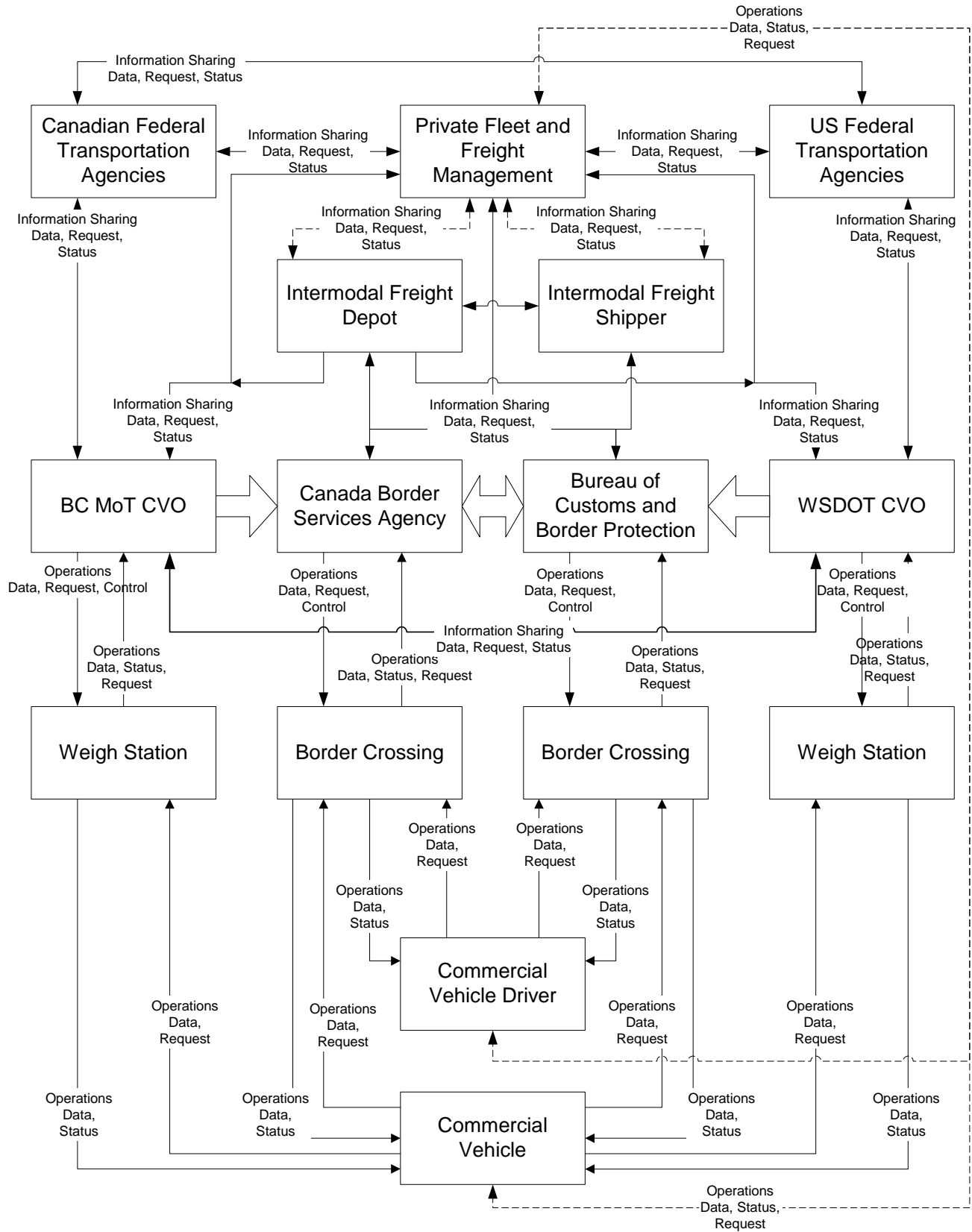


Exhibit 7-3: CVO Concept of Operations

Exhibit 7-4: CVO - Summary of Agency Relationships

Entity	Description of Relationships
Private Fleet and Freight Management	There is a collection of entities that gather the cargo together for transport. These entities include private fleet and freight management (i.e., trucking companies), intermodal freight shippers (i.e., brokers, freight forwarders, etc.) and intermodal freight depot (i.e., ports, rail yards, etc.). These three entities match cargo for transport with the private fleet and freight management companies that provide commercial vehicles and drivers. In turn, the trucking companies provide transportation agencies at the state/provincial and federal level with information on vehicle registration, fuel tax, safety, etc. The state/provincial CVO program issues transponders for qualified carriers. For the border agencies, information received from trucking companies includes pre-clearance information for vehicles and drivers – currently as part of the joint US/Canada Free and Secure Trade (FAST) program. Under the FAST program, trucks are equipped with transponders and drivers are given electronic identification cards.
Intermodal Freight Depot	At the intermodal freight depot (i.e., ports, rail yards, etc.), cargo is received and placed onto commercial vehicles for transport. Information on transponder equipped vehicles is transmitted to CVO and border agencies as the vehicles leave the facility.
Intermodal Freight Shipper	Intermodal freight shippers (i.e., importers, exporters, brokers, freight forwarders, etc.) prepare the required documentation on cargo that is shipped across the border. This information is generally electronically transmitted to the appropriate border agencies. These shippers are can be enrolled in the FAST program.
US and Canadian Transportation Agencies	Both US and Canadian transportation agencies manage national motor carrier programs that regulate and monitor commercial vehicles and drivers. Data, status and requests are transmitted between motor carriers and state/provincial CVO programs.
BC MoT and WSDOT Commercial Vehicle Operations	<p>The state/provincial CVO programs administer and regulate motor carriers that operate within their jurisdiction. The CVO programs are responsible for enforcing registration, fuel tax, safety, weights, dimensions and other program requirements. The CVO program data is shared with federal transportation agencies and could be shared with federal border agencies.</p> <p>The various state/provincial agencies that are responsible for aspects of the CVO program are working together to share and combine information to increase efficiencies and move toward electronic data interchanges with motor carriers. The CVISN program can also issue transponders directly to qualified carriers.</p>
Weigh Stations	<p>Much of the actual monitoring of commercial vehicles is conducted at weigh stations, including safety inspections. Many weigh stations have been equipped with Weigh-In-Motion technology and transponder readers that allow qualified vehicles to bypass the weigh stations.</p> <p>Weigh stations provide another location where transponder equipped vehicles could be monitored by the federal border agencies.</p>
US and Canadian Border Agencies	The border agencies control the passage of goods and persons across the international border. The Trade Act of 2002 has mandated that all manifest data electronically submitted to US Customs and Border Protection one hour prior to the vehicle's arrival at the southbound border crossing. Requiring this information in advance is useful to assess the relative risk of each movement. The border agencies also pre-qualify carriers and drivers.

Entity	Description of Relationships
Border Crossing	The border agencies operate the border crossings, manage the FAST and other expedited border crossing programs, and provide an appropriate level of inspection based upon their risk assessment.
Commercial Vehicle Driver	Drivers obtain commercial vehicle driver licenses from transportation agencies and are qualified for participation in the FAST program by the border agencies. The FAST driver electronic identification cards are read at the border-crossing booth and could be read at intermodal freight depots and weigh stations.
Commercial Vehicle	Commercial vehicles can be equipped with transponders for both the FAST and CVO programs and also with electronic cargo seals. All of these devices could be read at the border, weigh stations, and intermodal freight depots.

8. CONCLUSIONS

The transportation agencies, border inspection agencies and other border stakeholders will continue their on-going cooperative efforts to improve conditions at the border in order to ensure security and reduce congestion. This assessment of transportation technology at the Washington-British Columbia border concludes that transportation agencies can continue to play an important role in providing traveler information to the public in ways that leverage current border agency programs such as FAST and NEXUS through existing information dissemination capabilities. Continued efforts are recommended to expand electronic linkages between the commercial vehicle operations systems, especially CVISN and TCOS, with the systems operated by the border inspection agencies. The information gathered on vehicle movements away from the border could be of value to border agencies in monitoring travel movements and assessing risk. The Concept of Operations for transportation and security agencies presented in this report supports these future enhancements.