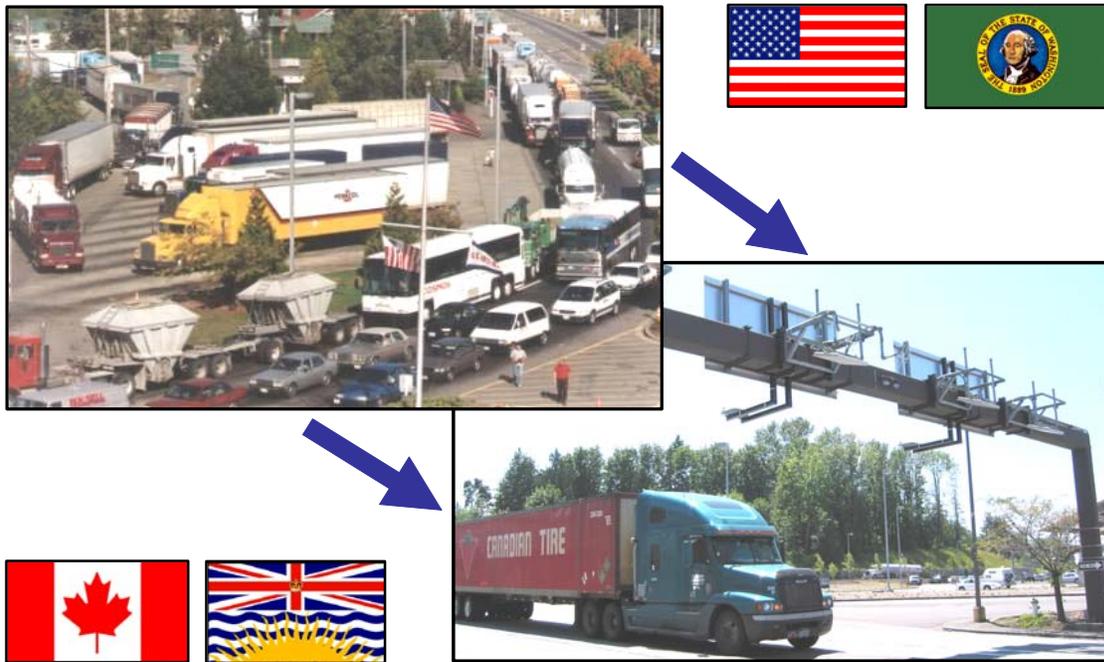


## Washington State – British Columbia International Mobility and Trade Corridor (IMTC)



### ITS – CVO Border Crossing Deployment Evaluation Draft Final Report Executive Summary



U.S. Department  
of Transportation

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## FREIGHT & ITS WEB RESOURCES

USDOT ITS Joint Program Office:

<http://www.its.dot.gov>

FHWA Office of Freight Management and Operations

<http://ops.fhwa.dot.gov/freight/>

USDOT Office of Intermodalism

<http://www.dot.gov/intermodal/freight.html>

ITS Cooperative Deployment Network (ICDN):

<http://www.nawgits.com/jpo/icdn.html>

ITS Electronic Document Library (EDL):

<http://www.its.fhwa.dot.gov/cyberdocs/welcome.htm>

**USDOT ITS Joint Program Office  
FHWA Office of Freight Management and Operations  
USDOT Office of Intermodalism (OST)**



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<b>15. Supplementary Notes</b> Mr. Mike Onder (Task Manager); Dr. Joseph I. Peters (COTR)			
<b>16. Abstract</b>  <p>The Washington State – British Columbia International Mobility and Trade Corridor (IMTC) ITS-CVO Border Crossing Deployment is allowing for the completion of a bi-national freight border crossing ITS system at the border, and is a follow-on effort to a multiyear border freight ITS deployment program funded by WSDOT, FHWA, and Transport Canada. However, while the ITS systems have now been fully deployed under this system, the physical infrastructure (i.e., additional lanes and revamped customs booth areas) on both sides that would allow for expedited clearance and travel time reductions to occur are still awaiting final funding decisions by WSDOT and Transport Canada. Therefore, it is not yet possible to measure the benefits of this system, since ITS-equipped trucks continue to have to wait in the same lanes and lines as non-ITS trucks.</p> <p>Based on this context, the SAIC-TranSys bi-national evaluation team, with the support of the FHWA Office of Freight Management and Operations and the ITS-JPO, decided in early 2002 to focus this evaluation effort on modeling the corridor benefits associated with future ITS dedicated truck lanes on both sides of the border, as well as associated trade and regulator benefits including weigh-in-motion data sharing and elimination of broker visits through enhanced systems. Here, the primary objective of this evaluation was to quantify, as much as possible, the relevant benefits and costs associated with the dedicated ITS truck lanes and associated corridor freight systems to IMTC stakeholders, and provide valuable data inputs and insight for future border crossing/corridor ITS technology programs.</p> <p>Based on the significant benefits and benefit-cost ratios, especially for the motor industry, that are highlighted in this Executive Summary, it is intended that the results of this report may serve as an input to the United States and Canadian effort to finalize funding for the infrastructure portions of the Dedicated ITS Truck Lanes concept in the near future.</p>			
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## EXECUTIVE SUMMARY

Industry and government are concerned about the capacity of land border crossings, and the highways that serve them, to handle steadily increasing volumes of truck traffic, especially containerized freight. Between 1994 and 2000, U.S. trade with Canada increased from \$243 billion to \$406 billion, an average annual growth rate of 8.9 percent. Correspondingly, commercial truck traffic across the Washington State/British Columbia border has been increasing since the implementation of NAFTA, amounting to an annual rate of growth of about 11.6 percent in the late 1990s.

(North / British Columbia, Canada)



(South / Washington, United States)

**Figure ES-1. Aerial View of Bi-National Truck Border Delay at the Blaine Crossing.**

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 business productivity is lost annually due to border crossing delays at just the Blaine, Washington border facility. To respond to this situation, the public and private stakeholders in Washington State and British Columbia established the International Mobility and Trade Corridor (IMTC) partnership. The IMTC is a coalition of over 60 U.S. and Canadian business and government entities whose mission is to identify and pursue improvements to cross-border mobility in the "Cascade Gateway".



**Figure ES-2. The IMTC Partnership.**

To alleviate these problems, the IMTC has partnered with the U.S. Department of Transportation (USDOT), Transport Canada, the Washington State Department of Transportation (WSDOT), and others to deploy the first fully operational and bi-national electronic border crossing system for trucks in North America. With a total United States and Canadian investment of \$4.35 million, this ITS deployment is the largest single investment in CVO border crossing ITS technology in history.

This “trade corridor” has been deployed with funding primarily from three USDOT- and WSDOT-sponsored efforts. The three efforts are an original northbound automated border crossing development project; a field operational test of electronic cargo container seals and freight information exchanges with port terminals; and a new southbound automated border crossing development project. Federal support for these three efforts has been overseen by the Office of the Secretary of Transportation and the FHWA’s Office of Freight Management and Operations.

This trade corridor deployment has provided a unique opportunity to examine the development of a working model system that coordinates shippers, motor carriers, and selected international governmental agencies linked to a single information system. This project is different from past and current dedicated short-range communications (DSRC) -based border crossing systems (e.g., North American Trade Automation Project [NATAP], Ambassador Bridge), which focused on very limited tests of ITS technologies. This project is deploying an operational prototype system, allowing for a more thorough system analysis and leading to valuable “lessons learned” for future ITS international border crossing initiatives through this evaluation effort.

Under the direction of the USDOT ITS Joint Program Office (JPO) and the FHWA Office of Freight Management and Operations, Science Applications International Corporation (SAIC) led the Evaluation Team with significant assistance from TranSys

International Consultants Limited (TSi). This evaluation effort was not designed to render judgment on the technical effectiveness of a completed operational test. Instead, the objective of this evaluation was to quantify, as much as possible, the relevant benefits and costs associated with ITS deployments to IMTC stakeholders, and provide valuable data inputs and insight for future border crossing/corridor ITS technology programs.

This trade corridor deployment is allowing for the completion of a bi-national freight border crossing ITS system at the border, and is a follow-on effort to a multiyear border freight ITS deployment program funded by WSDOT, FHWA, and Transport Canada. However, while the ITS systems have now been fully deployed under this system, the physical infrastructure (i.e., additional lanes and revamped customs booth areas) on both sides that would allow for expedited clearance and travel time reductions to occur are still awaiting final funding decisions by WSDOT and Transport Canada. Therefore, it is not yet possible to measure the benefits of this system, since ITS-equipped trucks continue to have to wait in the same lanes and lines as non-ITS trucks.

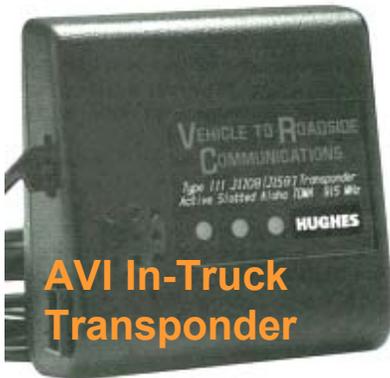
Based on this context, the SAIC-TranSys bi-national Evaluation team, with the support of the FHWA Office of Freight Management and Operations and the USDOT ITS-Joint Program Office, decided in early 2002 to focus this evaluation effort on modeling the corridor benefits associated with future **Dedicated ITS Truck Lanes**<sup>1</sup> on both sides of the border, as well as associated trade and regulator benefits including **Bi-National Weigh-in-Motion Data Sharing** and elimination of broker visits through enhanced systems. Here, the primary objective of this evaluation was to quantify, as much as possible, the relevant benefits and costs associated with the dedicated ITS truck lanes and associated corridor freight systems to IMTC stakeholders, and provide valuable data inputs and insight for future border crossing/corridor ITS technology programs.

## System and Operations Overview

When fully deployed, this trade corridor will provide for the first fully operational and bi-national electronic commercial vehicle operations (CVO) border crossing system in North America. At a total investment of \$4.35 Million, this trade corridor deployment will represent the largest single investment in CVO border crossing intelligent transportation system (ITS) technology to date. This deployment will provide a working system that coordinates shippers, brokers, truckers, and government agencies into one system. Additionally, this deployment also includes integration of the trade corridor system with private terminal logistics systems at the Ports of Tacoma and Seattle. Figures ES-3 and ES-4 provide an overview of the system technologies and system operations for this trade corridor.

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<sup>1</sup> In the current trade corridor deployment phase, while the technologies have been deployed at the border to allow for expedited border processing of transponder-equipped trucks by U.S. and Canadian Customs officials, trucks must wait in the same lanes as non-equipped trucks. This does not allow for significant time savings to be realized by motor carriers who equip their trucks with the transponders. Our evaluation therefore focuses on estimating the benefits associated with deploying the additional lanes and infrastructure required to give transponder-equipped trucks a separated “Dedicated ITS Truck Lane” which could provide for significant time savings in crossing the border for motor carriers enrolled in this system.



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**Blaine USCS: Northbound Exit**

Wednesday, June 26, 2002 7:03:28 PM

Unit Number	Carrier DBA Name	Container (E-Seal)	Lane	Passing Date Time / Status Icons
<a href="#">1566</a>	SHADOW LINES	<a href="#">GATU403887 (AA000601)</a>	3	6/26/02 6:42:00 PM
Unregistered			4	6/26/02 6:35:37 PM
Unregistered			3	6/26/02 6:24:25 PM
<a href="#">1599</a>	SHADOW LINES	<a href="#">TOLU238159</a>	3	6/26/02 6:21:03 PM
<a href="#">1464</a>	SHADOW LINES	<a href="#">WSLU487431</a>	3	6/26/02 6:17:35 PM
		<a href="#">WSLU4861376 (AA000608)</a>	3	6/26/02 6:10:37 PM
<a href="#">1598</a>	SHADOW LINES		3	6/26/02 6:10:31 PM

**Figure ES-3. Overview of IMTC Trade Corridor Technologies.**

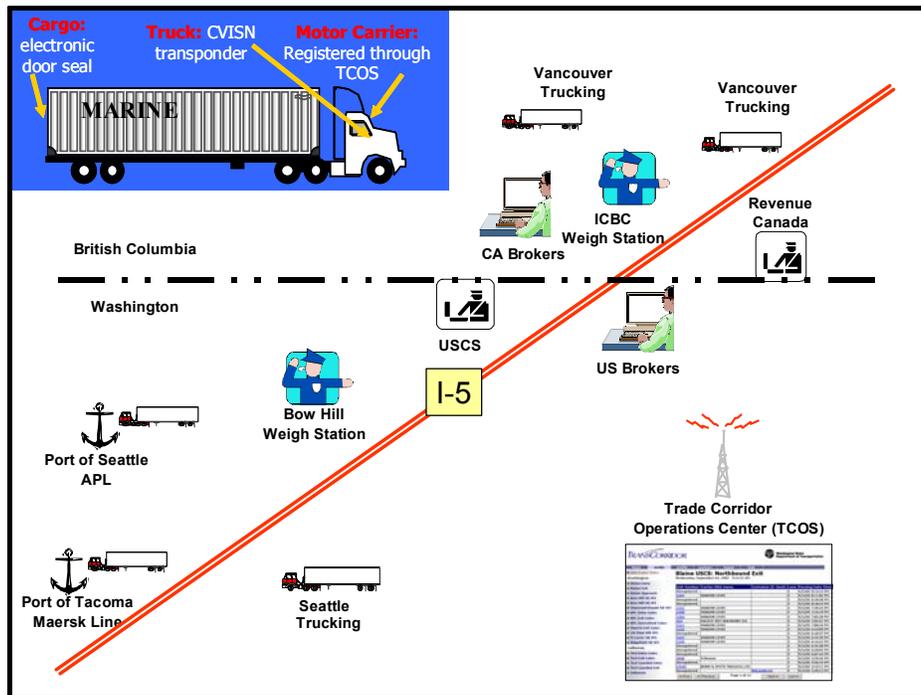
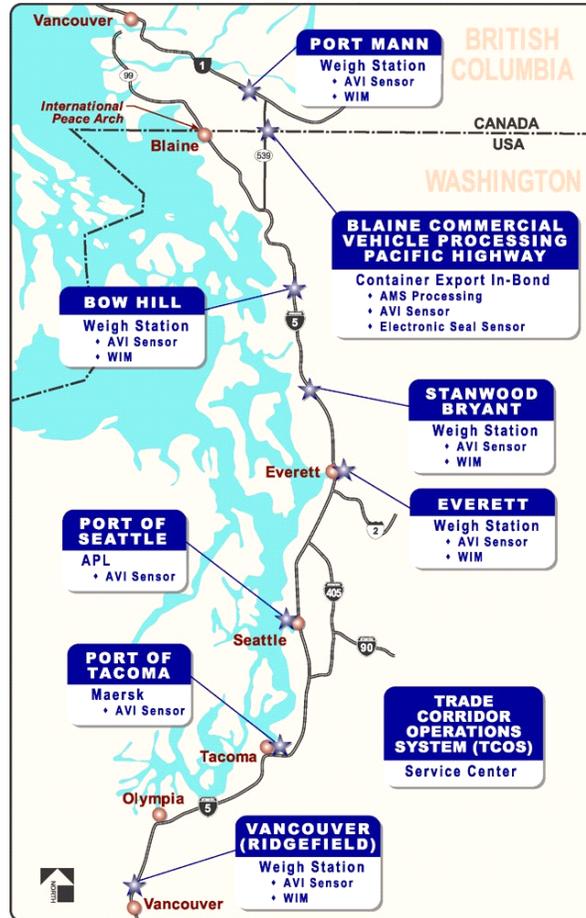


Figure ES-4. Overview of IMTC Trade Corridor Operations.

This deployment is monitoring northbound and southbound in-bond<sup>2</sup> container movement from point of origin in the Ports of Seattle and Tacoma to the Vancouver region, and vice-versa. Containers leaving the Ports or the Vancouver region are linked to the truck cab Automatic Vehicle Identification (AVI) transponder to the associated truck and the electronic seal to the associated container in the Trade Corridor Operations System (TCOS) database. The motor carrier sends TCOS an electronic message to identify cargo (the container number); vehicle (vehicle transponder serial number); and authorized driver (commercial driver license number).

For southbound in-bond shipments, the shipment is first detected at the Port Mann Weigh-in-Motion (WIM) station AVI reader and then at the U.S. Customs<sup>3</sup> commercial vehicle crossing at Blaine. The advance information is verified at the U.S. Customs booth and an in-bond transaction report is generated. Authorized system users are provided with a list of in-bond containers/transactions being processed through the border. A similar process occurs for northbound shipments, where AVI reads from the Ports, the Federal Way and the border approach providing for shipment detection.

Additionally, a network for assimilating and exchanging information was recently coordinated between British Columbia and Washington State to enable bi-national information exchange. This bi-national communication sharing permits timely, accurate electronic motor carrier information transfer between British Columbia regulatory agencies and their counterparts in Washington State. This system will expand upon the Commercial Vehicle Information Exchange Window (CVIEW)/Commercial Vehicle Information System Networks (CVISN) system currently operating in Washington State, facilitating the virtual screening of commercial vehicles operating on both sides of the international border.

Both northbound and southbound trucks operating in the IMTC will be monitored for safe and legal compliance, allowing eligible carriers to bypass future IMTC weigh stations. Significant time savings are projected due to potential ITS enabled bi-national information exchange between British Columbia and Washington State-equipped WIM sites. Bypass savings capture the potential travel time benefits for commercial motor vehicles bypassing WIM stations once compliance is verified at one facility and other weigh station sites are notified of compliance.

The Trade Corridor Operating Systems (TCOS) information management system is used to support and integrate the AVI data reads. An Internet-based system, TCOS links a shipping line's information system with the U.S. Customs' Automated Manifest System (AMS). System users can log onto a secure Website by entering in a pre-approved user name and password. All tracking and data functions can be viewed and managed over the Internet. Additionally, U.S. Customs has the visibility of all container

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<sup>2</sup> "In-bond" is a procedure where goods are transported or warehoused under customs supervision until they are either formally entered into the customs territory of the United States and duties paid, or until they are exported from the United States. This freight has not yet been cleared by U.S. Customs, but has entered the United States with the approval of U.S. Customs; it may then pass into Canada or Mexico from the U.S.

<sup>3</sup> The U.S. Department of Homeland Security Bureau of Customs and Border Protection (CBP) is the new name for the organization that was formerly the U.S. Customs Service. In this document, the term "U.S. Customs" is used to identify this new organization (see: <http://www.customs.gov>).

movements, and can flag certain containers in advance for inspection based on security or other concerns.

## Evaluation Findings

This section presents the conclusions and recommendations developed by the Evaluation Team based on data analyzed and the findings developed over the course of this modeling and analysis evaluation effort. The conclusions highlight “lessons learned” from the presented analyses, and the recommendations provide suggestions to be considered in other relevant border ITS efforts and across other applicable border regions.

### ***Conclusions – Utility of Dedicated ITS Truck Lanes at the Border***

While the ITS systems necessary for the ***Dedicated ITS Truck Lanes*** described in this report are already deployed, the physical infrastructure (i.e., additional lanes and revamped customs booth areas) on both sides that would allow for expedited clearance and travel time reductions to occur are still unfunded by WSDOT and Transport Canada. In response to this, with the support of FHWA, the ITS-JPO and a bi-national consensus of stakeholders involved in this study, it was determined in early 2002 that this evaluation should focus primarily on modeling the corridor benefits associated with future ITS dedicated truck lanes on both sides of the border.

To implement this approach, the Evaluation Team fielded a team of surveyors and collected on-site border operations data for a 2-week period in June 2002. Following this, a previously built and validated border travel demand model, SLM-49, was significantly augmented, and then used to model and compare future “with” and “without” Dedicated ITS Truck Lane cases for both directions at the border. These results, along with other corridor ITS inputs, were then applied to a 10-year benefit-cost model, which resulted in a series of findings which lead to a unequivocal conclusion finding regarding the utility of Dedicated ITS Truck Lanes at the border.

This key conclusion, is that even under the most conservative modeling scenario (only 10 percent of trucks with transponders in 2003 growing to 15 percent in 2013), the Evaluation Team estimated that over the next 10 years, the deployed Dedicated ITS Truck Lanes (including reduced broker stops) would result in a demonstratively impressive benefits stream to the regional economy. This will occur through motor carrier travel and operations savings, with discounted benefits growing from \$8.6 million in 2003 to \$29.3 million in 2013. The primary source for these benefits will be on the southbound approach to the U.S. Customs booths for both ITS and non-ITS-equipped trucks. Benefits for non-ITS commercial vehicles were actually higher than those for ITS commercial vehicles, as non-ITS vehicles benefit significantly from the reduced queues due to the ITS trucks using the Dedicated ITS Truck Lanes. Essentially, both ITS and non-ITS equipped trucks will see substantial time savings under a deployed Dedicated ITS Truck Lane system at the border.

When compared to the detailed cost estimates that were developed for this report, the Evaluation Team estimated that benefit-cost ratios here for the Dedicated ITS Truck Lanes ranged from approximately 29.1:1 to 42.2:1 (depending on level of ITS market penetration). This is due to relatively low deployment costs, coupled with the very large

time savings for both transponder-equipped trucks as well as those without transponders – especially in the southbound direction, as noted above.

Covering the range of the conservative to robust modeling scenarios, the discounted benefits of the Dedicated ITS Truck Lane and the reductions in stops at the brokerage houses are estimated to be between at: \$124.2 and \$169.9 million over the next 10 years, and represent by far, the most significant benefits considered in this analysis. Due to the overwhelming proportion of total benefits realized through the border crossing ITS deployments, the corridor-wide combined payback period is 1 year for all three ITS market penetration scenarios.

Based on the significant benefits estimated here, the primary conclusion of this evaluation effort is that the deployment of Dedicated ITS Truck Lanes at the Blaine/Surrey international border crossing, particularly in the southbound direction through U.S. Customs, is more than justified. With benefit-cost ratios of at least 29 to 1, and payback periods to the regions economy of less than a year, the deployment of this ITS system and operational concept can be defended.

This conclusion is so dramatic that the Evaluation Team believes that it may serve as an input to United States and Canadian efforts to fund the infrastructure portions of the Dedicated ITS Truck Lanes concept in the near future. With the system already up and running, the investment in the infrastructure (additional lanes and new customs booth configurations) on both sides of the border is all that would be required to begin realizing the benefits that have been outlined here.

### ***Conclusions– Utility of Bi-National Virtual Weigh Stations***

In addition to Dedicated ITS Truck Lanes goal, the IMTC has supported the development of a network for assimilating and exchanging information between British Columbia and Washington State motor vehicle enforcement agencies to enable bi-national weigh-in-motion information exchange – referred to here as the ***Bi-National Virtual Weigh Station*** operational concept. This bi-national communication sharing permits timely, accurate electronic motor carrier information transfer between the Insurance Corporation of British Columbia (ICBC) and the Washington State Patrol. With this CVISN-based system, both northbound and southbound trucks operating in the IMTC will be monitored for safe and legal compliance, allowing eligible carriers to bypass IMTC corridor weigh stations on both sides of the border. It should be noted that at the time this report is going to publication (October 2003), the deployment of this operational concept is imminent.

Significant time savings for motor carriers and resource savings for enforcement personnel were estimated in the Evaluation Team's benefit-cost analysis, which was based on statistical weigh station usage data provided by the WSDOT and the ICBC, and focused on five weigh stations along the IMTC corridor. The analysis showed that discounted travel time savings for motor carriers associated with bypassing weigh stations are expected to be between \$25.6 and \$61.7 million over the next 10 years. The corridor bypass time savings occur as driver/vehicle/shipment are screened initially via electronic means or through physical inspection, then are cleared from further inspections along the corridor. This information is then passed electronically to other weigh/inspection sites along the corridor (including bi-national WIM data sharing

between Washington and British Colombia), subject to verification via WIM and AVI transponder technologies.

Additionally, for the enforcement agencies, safety benefits were also estimated based on the expected refocusing of enforcement activities on the inspection of non-electronically screened (transponder-equipped) vehicles. This would be expected since resource efficiencies to the agencies would be realized through the elimination of “double weigh-ins” of “safe and legal” trucks along the IMTC corridor, allowing additional resources to be focused on non-ITS trucks, and especially carriers considered “high risk”. Based on this, the discounted safety benefits associated with this operational concept are estimated to be between \$21.1 and \$50.9 million over the next 10 years. These benefits were estimated using three key inputs from federal and state sources.

Overall, the weigh station ITS deployments showed lower overall returns and higher investment costs than for Dedicated ITS Truck Lanes. Nevertheless, the weigh station ITS deployments still showed significantly positive benefit-cost ratios ranging from 4.0:1 to 8.5:1, again related to the overall level of ITS participation. The discounted benefits for the weigh station ITS deployments range from approximately \$35 to \$102 million, moving from low to high ITS scenarios.

The payback of investment for the weigh station ITS deployments requires longer time periods and are more ITS participation rate-sensitive than for the border crossing ITS deployments. This is because of the greater first cost requirements for the weigh stations and a benefit stream dependent only upon time savings realized by transponder-equipped trucks. The estimated payback periods for the weigh station ITS deployments are 2 years for the low and medium ITS scenarios, and 1 year for the high ITS scenario.

The preceding discussion highlights the benefits of employment of a **Virtual Weigh Station** operational concept in a bi-national border region. With conservative benefit-cost ratios above 4 to 1, payback periods of less than 2 years, and safety benefits to the traveling public, the conclusion of the Evaluation Team is that this operational concept will provide significant utility to motor carriers, enforcement agencies and the traveling public in U.S. Canadian border regions. As this technology is currently just being deployed, it will be interesting to examine how this concept is actually deployed in the field, and if the benefits estimated in this evaluation study can be validated.

### **Conclusions – Private Sector Benefits**

Private sector benefits were overwhelmingly positive for the corridor ITS freight deployments modeled in this effort! This analysis concludes that motor carriers will realize net positive returns on ITS participation almost immediately. The private-sector net discounted benefits accrue concurrent with the costs of ITS deployment and given the relatively small costs of participation with the large travel time benefits, it is seen that throughout the study horizon, benefits exceed costs. Therefore, private sector breakeven is immediate for all ITS deployment scenarios.

To illustrate this better, the Evaluation Team examined the case for a typical mid-size trucking company involved in daily drayage moves across the border. For this company, with an initial investment of \$550 for transponders to equip a fleet of 11

trucks, the benefit-cost analysis showed that for a benefit of over \$12,000 per year in travel time savings could be expected due to the use of the dedicated ITS truck lanes at the border and through weigh station bypass events. Here, this trucking company *would reach a financial breakeven point for its fleet in less than a week!*

Administrative benefits to the private sector were also estimated by the Evaluation Team. The discounted administrative time savings benefits over 10 years is estimated to be \$8 million for customs brokers, \$2.3 million for shippers, and \$2.2 million for motor carriers. Using simulation, overall potential time savings of 35 to 37 percent were estimated. Using prevailing wage rates for clerical staff, the per-transaction cost savings were estimated at \$0.30 for shippers, \$0.28 for motor carriers, and \$1.03 for customs brokers. Though these savings may seem relatively small, given projected levels of approximately 795,000 and 1,420,000 annual transactions for the Base Year and Year 10, the administrative savings become significant.

Based on the preceding, it is the conclusion of the Evaluation Team that the benefits to deploying the Dedicated ITS Truck Lanes and the Virtual Weigh-in-Motion systems will result in almost immediate savings to the private sector, particularly motor carriers. The benefit-cost estimates for industry are so overwhelmingly positive, that the Evaluation Team believes that the results highlighted here may be instrumental in assisting the IMTC public and private partners in administering increasing numbers of transponders to motor carriers in the region. Furthermore, the results here also point the way for other United States – Canadian border regions to move forward with analogous systems to improve the economic competitiveness of their freight industries.

### ***Conclusions – Public Sector Benefits***

While not providing the dramatic results seen for the private sector above, public sector benefits were estimated by the Evaluation Team to be greater than costs, even in the most conservative modeling scenarios. Public-sector costs involve ITS deployment infrastructure at the border crossing and weigh stations, while benefits accrue to the public sector through enhanced motor carrier safety enforcement and improved air quality impacts. The estimated public-sector benefit-cost ratios range from 1.6:1 to 4.4:1, moving from low to high ITS deployment scenarios.

Overall, the public sector will expend a relatively large proportion of deployment costs initially, with benefits accruing modestly over the study horizon. The level of public ITS benefits accrued over time is directly proportional to the private sector ITS participation rates. It is estimated that public sector payback periods are 6 years, 5 years, and 3 years, respectively, for the low, medium, and high ITS deployment scenarios.

The costs burden for the public sector for the Dedicated ITS Truck lanes (and associated systems) on both sides of border are estimated at approximately \$10.8 million in current year dollars. Of this amount, \$3.3 million represents ITS deployment at the north/southbound border crossing at Blaine and supporting ITS deployment at the APL intermodal facility. Of this \$3.3 million, approximately \$2.6 million are estimated costs for construction of dedicated ITS truck lanes in the north- and south-bound directions. Of the remaining \$0.7 million, approximately \$532K represents the costs of: site-specific systems engineering and system installation; AVI readers and supporting hardware; communications links; and computer system hardware and software. Transcore software enhancements account for the remaining \$170K.

Additionally, ITS deployments at four weigh/inspection stations in Washington State, and one in British Columbia are estimated to cost \$7.5 million to deploy. Recurring costs are estimated to be \$.14 million per year at the border facilities, and \$0.19 million per year at the weigh stations.

In addition to the public sector safety benefits associated with the Virtual Weigh Station operational concept detailed above, benefits associated with air quality improvements for the public sector associated with the ITS systems were also estimated by the Evaluation Team. Here, air quality benefits arise from reductions in truck idling times at the border crossings and the weigh stations were expressed in terms of avoided health costs associated with diesel truck exhaust. Based on this, the discounted air quality public benefits of the ITS deployments are estimated to be between \$1.6 and \$2.5 million over the next 10 years. The border-crossing share of these benefits ranges from 65 to 80 percent (high to low deployment scenario).

Given the results shown above, even in the absence of the overwhelmingly positive results for the private sector detailed above, the deployments of these freight ITS technologies can still be justified given the most conservative modeling scenario estimate which showed a *public investment break-even point of 6 years*. However, when the public sector does examines the significant private sector benefits that would result from these deployments in combination with their own benefits, a very compelling case can be made for the public sector to move forward with the deployment of the Dedicated ITS Truck Lanes and Bi-National Virtual Weigh Station operational concepts.

### ***Conclusions – Lessons Learned from the IMTC Partnership***

The Evaluation Team has concluded that the IMTC public-private partnership provides an international model for development of freight border ITS projects across international borders. The IMTC structure, functions, processes and real-world ITS deployment results to date can serve as an input or point of discussion to other bi-national stakeholder communities in border regions with significant freight flows along United States - Canadian border, as well as perhaps analogous stakeholder communities along the United States - Mexican border. The IMTC stands out as a public-private partnership of diverse, bi-national interests, lead by a public agency, responding to local congestion concerns by going after national funds for bi-national transportation funding. The IMTC model involves successful interactions with federal, provincial, state, and local governments from two countries to fund and deploy major border ITS solutions. The IMTC is regarded in the region as a successful champion for obtaining funding and implementing border ITS projects in response to a broad range of border transportation goals that the ITMC has set for the region.

For the IMTC Phase II deployment assessed in this report, the IMTC and project stakeholders successfully addressed a concern related to the freight data privacy of this system. The TCOS Border Freight ITS System provides security while being an intermediary to the public and private IMTC stakeholders. Users must provide a password to gain secure access to the user's specified authorized trade corridor information. The key feature here is that users can only access and view the data for which they are authorized. Only Customs, WSDOT, and TransCore have access to a global view containing freight information for each company using the system; no competitive information can be seen by companies accessing the site.

The IMTC partnership has also facilitated open discussions between the customs agencies of the United States and Canada at the Blaine/Surrey international crossing. These discussions, as well as discussions at the national-level of both countries, may lead to joint facilities being deployed at the border in the near future. Co-location of inspection agencies would allow economies of scale, greater coordination of inspection efforts, and direct on site communication between U.S. and Canadian Customs. Moreover, co-location of inspection booths at the border could eliminate the “double stops” that currently occur for trucks in each direction as they have to stop at both countries customs booths when traveling across the border.

A number of the IMTC public and private partners have been involved and have supported the new security focus on border freight movements since 9-11. Following the terrorist attacks of September 11, 2001, all freight shipments coming into the United States have been under dramatically increased scrutiny to ensure national security. In support of this, U.S. Customs, supported by Canada Customs and industry, proceeded with the development a number of new systems and practices, including the C-TPAT program, the Container Security Initiative (CSI), and the FAST program. However, a proposal last Spring that would have required that manifests to be transmitted to USCS 4 hours in advance of cargo lading, created an Industry uproar, as many companies were concerned about the rule’s potentially disruptive impacts to just-in-time logistics regarding regional business-to-business deliveries.

Finally, one area in the IMTC region, as well as in North America, where progress is not being made involves the lack of DSRC transponder standards. While a single national 915-MHz DSRC standard is ideal and should be an ultimate goal, it appears that not only is integration or NORPASS and PREPASS (both CVISN-compliant systems) unlikely in the near-future, but some in industry are moving forward with a proposal for a completely incompatible 5.9-GHz DSRC standard, even as current 915-MHz systems are now just being deployed fully at a national level. The primary issue as use of transponders expand in the IMTC region is the need for more uniformity in transponder interoperability to preclude motor carriers from having to equip their vehicles with several transponders.

## Recommendations

Shown below are the five primary recommendations that the SAIC Evaluation Team is offering to USDOT, Transport Canada, WSDOT, British Columbia, the IMTC partnership, and others in government and industry to consider based on the conclusions obtained in conducting this evaluation.

- 1) **The United States and Canadian Federal and State/Provincial Governments Should Move Forward with the Deployment of Dedicated ITS Truck Lanes at the Blaine/Surrey International Border Crossing.** The benefit-cost analysis for this system conducted by the Evaluation Team provided overwhelming justification for the deployment of this system. While private sector benefits far outstripped public sector benefits, the payback time for public benefits only for public investment was still only 6 years even under the most conservative benefit-cost modeling scenario. Given these results, WSDOT, FHWA, and Transport Canada, may want to consider partnering to fund and construct the physical infrastructure (i.e., additional lanes and revamped customs booth areas) on both sides that would

allow for expedited clearance and travel time reductions to occur. ***The ITS border systems to make this operational concept a reality are already deployed – it is now up to government bodies to complete the job and build the infrastructure which will allow the benefits developed in this report to be realized by both the private and public sectors.***

- 2) **The United States and Canadian Federal and State/Provincial Governments Should Move Forward with the Deployment of Bi-National Virtual Weigh Stations.** The benefit-cost analysis for this system conducted by the Evaluation Team provided sound justification for the deployment of these systems. With conservative benefit-cost ratios above 4 to 1, payback periods of less than 2 years, and safety benefits to the traveling public, deployment of these technologies will provide significant utility to motor carriers, enforcement agencies, and the traveling public in the IMTC border region.
- 3) **The IMTC, WSDOT, and British Columbia Should Consider Developing a Marketing Program to Demonstrate the Potential Benefits Here to the Private Sector to Encourage Increased Usage of These ITS Technologies.** The benefits estimated by the Evaluation Team in this report of adopting these ITS systems for the private sector are enormous. The investment required for motor carriers to participate is almost negligible given the near immediate benefits they will receive. And all stakeholders in the supply chain will benefit from travel time savings and administrative efficiencies enabled directly or indirectly from ITS. The private sector must be made aware of these benefits through educational outreach directly through government channels or from organizations such as the IMTC. ***As the private sector at the Blaine/Surrey crossing embraces border freight ITS technology, this will help to spur on private sector interest and participation in freight ITS border systems in other U.S. border regions with both Canada and Mexico.***
- 4) **Apply the Benefit-Cost Analysis Methodology Developed Here to Additional International Border Crossings and Trade Corridors Where Border Freight ITS Solutions have been Proposed.** Where freight ITS solutions are being proposed, the benefit-cost methodology and the border transportation demand model developed in this effort for the IMTC Blaine/Surrey international border crossing should be applied at other major international border crossings and adjacent trade corridors on both the United States – Canadian and United States – Mexican borders. Individual benefit-cost studies at other border crossing sites and trade corridors should be used to validate future freight ITS and supporting infrastructure deployment, while tailoring planning efforts to regional transportation and economic demands.
- 5) **Within the Current E-Seal Phase II Evaluation, Expand the Evaluation Results Developed Here to a Larger Corridor Benefits Assessment to Include International Container Movement through Supply Chains.** The E-seal Phase II Evaluation, which recently began, will be evaluating technologies similar to those tested in the initial electronic seal deployment, and also incorporating the border ITS systems detailed in this report. This FOT will explore international end-to-end container flows, oriented toward the development of an integrated security system, of which the E-seal is just one element. The overall objective will be to evaluate the ability of a technology to both increase the security of container movements and

improve the documentation and processing of intermodal freight. As such, the SAIC Evaluation Team involved in that project should consider using the benefits estimation tools and results from this project as a major input, with a potential goal being the expansion of this benefits assessment approach to incorporate international container movements from points of origin overseas.