ATLANTIC PROVINCES INTELLIGENT TRANSPORTATION SYSTEMS STRATEGIC PLANNING STUDY

Executive Summary

Prince Edward Island

NOVA SCOTIA

New Nouveau Brunswick CANADA

Newfoundland & Labrador

Atlantic Canada Opportunities Agency

Transport Canada Transports Canada

November, 2002

IBI GROUP MRC ADI

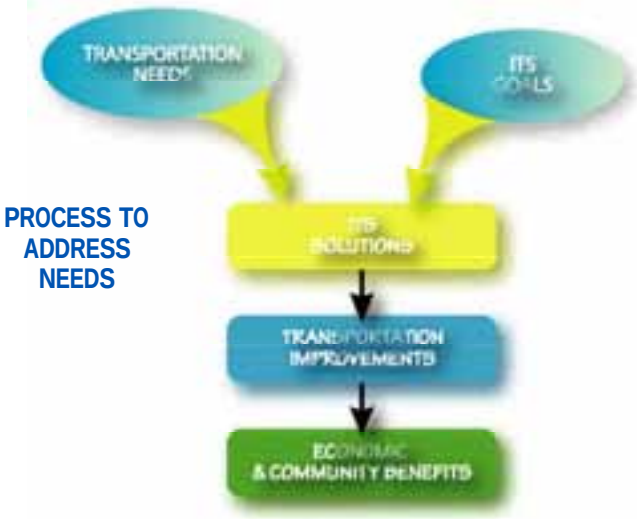
Introduction

There are a number of unique transportation challenges faced by the Atlantic Provinces. The region has a widely dispersed population interconnected via a network of critical road, bridge, and ferry links. Inclement weather can induce severe and sudden impacts on the transportation network. Some areas of the region are quite remote to major North American markets and therefore rely on an effective transportation network to minimize costs. Other areas within the region, namely New Brunswick, are in relatively close proximity to the large northeastern U.S. market and rely upon the associated trade corridors. Trade and the movement of commercial vehicles are critical to the economic viability of the region, and tourism plays a large and ever increasing role in the economy.

Intelligent Transportation Systems (ITS) refers to the use of technology to improve the efficiency, safety, convenience and accessibility of surface transportation systems. In the context of the Atlantic Region, ITS provides the opportunity to:

- improve road safety and emergency response, with an emphasis on the rural environment;
- improve accessibility for tourism;
- improve efficiency for intermodal facilities, commercial vehicles and border crossings; and
- enhance the economic prosperity of the region.

The Strategic Plan incorporates the requirements and ambitions of a broad range of stakeholders who have an interest in the advancement and implementation of ITS in the region. The work began with an initial outreach to the stakeholder community and an environmental scan to assess the needs of each province. The needs were translated into an ITS vision for the region which in turn was refined to form the User Service Plan. Through stakeholder involvement, 22 specific strategic projects were ultimately developed, resulting in an implementation plan. An Economic Development and Academic/Research component was performed in parallel to the main project, focusing on advancing the Atlantic Region ITS industry.



PROCESS TO ADDRESS NEEDS

Prince Edward Island
NOVA SCOTIA
New Nouveau Brunswick
Newfoundland Labrador
Atlantic Canada Opportunities Agency
Transport Canada Transports Canada

Participation

The Strategic Planning effort was led by a project steering committee that included:

Nancy Lynch, New Brunswick Department of Transportation
Doug Shea, Newfoundland and Labrador Department of Works, Services and Transportation
Mike Kendrick, New Brunswick Department of Transportation
Cathy Worth, Prince Edward Island Department of Transportation and Public Works
Janice Harland, Nova Scotia Department of Transportation and Public Works
Shannon Sanford, Business New Brunswick
Mark Gourley, Atlantic Canada Opportunities Agency
Daryell Nowlan, Atlantic Canada Opportunities Agency
Michael Zinck, Atlantic Canada Opportunities Agency
Andrew Parsons, Atlantic Canada Opportunities Agency
Harold Hefferton, Transport Canada
Roger Saunders, Transport Canada

The involvement of all project stakeholders was vital to the development of the Strategic Plan. Effective methods of maintaining stakeholder dialogue were used to receive input from stakeholders that shaped the ITS vision, goals and objectives. A project website was developed to interact with project stakeholders. The website was used to conduct an on-line survey of stakeholder activities and interest in ITS. The website was also used to post meeting announcements, background information, and completed documents. A series of meetings were held to maintain stakeholder dialogue:

Meetings	Attendees
The initial sessions were held in Moncton, Charlottetown, Halifax, and St. John's. The one-day sessions were used to introduce the study, describe ITS, and obtain input on the Atlantic Region transportation needs, the ITS vision, the higher priority ITS User Services, and some potential "early winner" ITS projects.	80
The second round consisted of a one-day workshop held in Moncton. This workshop was used to obtain input on the resources necessary to implement ITS projects in the Atlantic Region, the potential barriers, and the steps that would be required for delivery of ITS projects.	60
The third round consisted of half-day workshops held in Halifax and in St. John's. The Halifax workshop was partnered with an ITS Capabilities Showcase. The St. John's workshop was held in conjunction with the Canadian Transportation Research Forum (CTRF) Conference. These workshops were used to obtain additional input on the project profiles, and the proposed deployment plan.	42

It was through the dedication and interest of eighty stakeholders within the region that the Strategic Plan evolved to reflect the needs of the Atlantic Provinces.

Stakeholders included:

- owners/operators of transporation infrastructure
- emergency service providers
- commercial vehicle operators
- tourism industry representatives
- suppliers and service providers
- academia
- special interest groups

Benefits of ITS

For commercial vehicles - On-board safety systems, electronic clearance and automated roadside safety inspections are estimated to reduce fatalities by 14 to 32%. Automated administrative processes yield benefit/cost ratios of 4:1 for medium sized carriers and 20:1 for large-sized carriers
(source: U.S. D.O.T.)

For rural areas - Use of mayday emergency notification devices could reduce the time it takes to discover a rural accident from an average of 9.6 minutes to 1 minute.
(source: U.S. D.O.T.)

ITS has become a mainstream element of the transportation industry, with a proven ability to improve service delivery and reduce costs.

Efficiency

Roadway sensors are used to identify areas of congestion on the road network. This allows for route-guidance through changeable message signs or radio announcements. Electronic Payment methods efficiently collect tolls and tariffs, increasing through-put at border-crossings and toll facilities. Urban areas optimize road-usage with adaptively controlled traffic signals.

Productivity

Commercial Vehicle Operators use asset management systems to increase the productivity of their fleets and containers. Technology allows trucks to be monitored and inspected without losing time. Electronic Clearance can be incorporated at border crossings and inspection areas to eliminate or greatly reduce the length of stoppages.

Safety & Security

Drivers can be alerted of potential hazardous conditions. Incidents can be detected automatically, allowing for greatly reduced emergency vehicle response times. Electronic identification improves the process for screening cargo and drivers at border points.

Environment

Electronic Tolling and Advanced Traffic Management mitigates congestion leading to a reduction in emissions. Improving public transit systems by incorporating ITS can lead to increased ridership, and less dependence on automobiles.

Economy

Tourism benefits through the application of advanced Traveller Services to provide pre-trip and en-route trip planning, reservations, and current travel and weather information. Trade benefits through increased accessibility resulting from Commercial Vehicle Operations applications

Examples of Atlantic ITS projects are:

St. John's Metrobus Schedule Management System - Automatic Vehicle Location system that tracks the location of the 50-bus fleet, facilitating schedule management and the provision of real-time information on bus arrivals.

Electronic Toll Payment and Bridge Traffic Management - Electronic payment systems and dynamic signage on the Halifax-Dartmouth (H-D) bridges and the Confederation Bridge. The MacPass system reduces transaction times on the H-D bridge by 85%, thereby mitigating plaza congestion.

Halifax Adaptive Traffic Signal Control System (SCOOT) - Real-time data continuously updates traffic signal timings, thus increasing operational efficiency and providing more throughput on the existing road system. Fuel savings are estimated at $2-3 million over 3 years.

Weigh-In-Motion, New Brunswick - Automated weighing of vehicles at speed to eliminate the need for trucks to stop, thereby reducing delays to commercial vehicle operators and collision risk at the access points. The Longs Creek installation avoided substantial capital costs associated with relocation of the main scale facilities.

Road Weather Information Systems (RWIS) - RWIS implementations in New Brunswick, Prince Edward Island and Nova Scotia provide current conditions monitoring/forecasting to optimize winter maintenance and provide advisories to travellers.

ITS Vision

In developing the Strategic Plan, it was important to first set out an ITS vision for the coming twenty years...

> *... People and goods move seamlessly throughout the Atlantic Region. Technology performs a key role in improving the performance of transportation systems. Information technology is a driving force behind how people get to work, do business, and sell and transport goods. The role of the public transportation right-of-way has expanded to include a telecommunications backbone making "e-solutions" for mobility and commerce possible in the region. Consider...*

Travellers can:

- pay tolls electronically without having to stop;
- receive current region-wide travel and weather condition updates before or during their trip; and
- readily communicate with their places of business, make hotel or ferry reservations, and have advance information regarding routes, schedules and space availability.

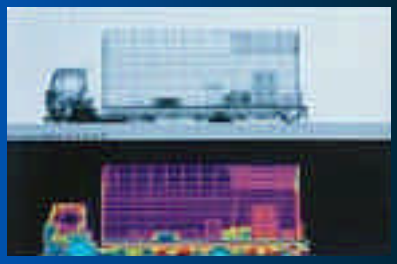
Commercial Vehicle Operators can:

- pay tolls and tariffs electronically at toll facilities and the New Brunswick - Maine border crossings;
- use enhanced tracking and real-time management of shipments en-route and at intermodal terminals; and
- obtain electronic clearance past weight/inspection stations.

Public Authorities can:

- receive automatic notification of an incident and dispatch Emergency Services along the fastest route to the site, based on real-time travel information and dynamic route guidance in the vehicle;
- improve public transit system performance using sophisticated vehicle monitoring and customer information systems; and
- optimize the application of winter maintenance resources using forecasting based upon region-wide real-time conditions monitoring.

Electronic Toll Tag


Automated Cargo Inspection

Public Transportation Automatic Vehicle Location

The Strategic Plan

"The Government of Canada is committed to the implementation of a comprehensive ITS strategy for Canada"
Transportation Minister
David Collenette

Transportation Needs & ITS Goals

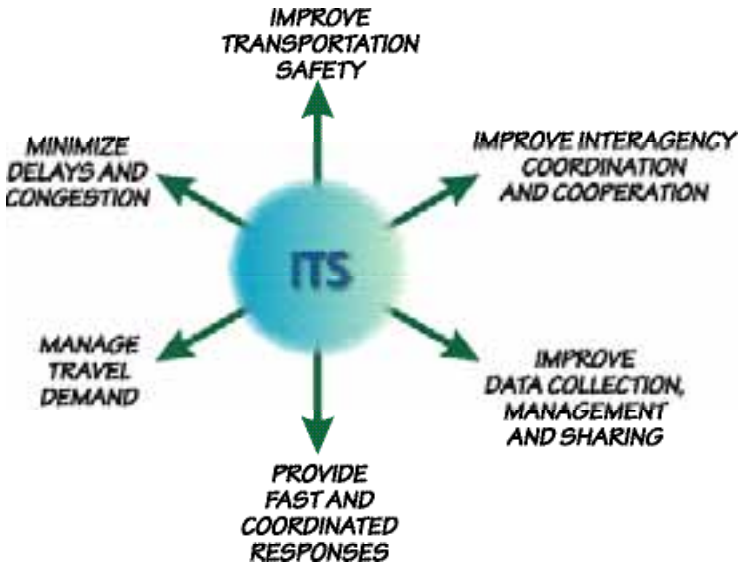
ITS is a useful tool for developing and enhancing the transportation system to accommodate the growth potential of the region. Through input from the participants in the region, fifteen critical Transportation Needs were identified:

Transportation Needs

1. Expedited Border-Crossing Inspection and Clearance for Commercial Vehicles
2. Reduced Rural Road Collisions Through Early Detection of Adverse Conditions
3. Reduced Incidence, Severity and Cost to the Community of Road Collisions
4. Improved Safety in Road Work Zones
5. Enhanced Management of Winter Maintenance Operations
6. Expedited Weight, Credential, and Safety Checks for Commercial Vehicles
7. Road Emergency Notification and Information System for Rural Areas
8. Improved Ferry Services
9. Travel Incentives and Traveller Information to Promote Tourism in Atlantic Canada
10. Enhanced Safety and Security for Travellers and for Transportation Operators and Facilities
11. Enhanced Ability to Detect, Verify, and Respond to Incidents on Major Roadways
12. Enhanced Tracking and Real-Time Management of Containers and Other Goods at Intermodal Terminals
13. Real Time Transit Service Monitoring and Public Needs
14. Improved Management of Fleet Transportation Services
15. Real-Time Management of Parking Operations

ITS Goals

The Strategic Plan features a set of ITS Goals that structure how ITS should be used in addressing the identified needs. The following goals were recognized as being fundamental to the successful application of ITS in the region:



The Strategic Plan

User Services

The proposed ITS solutions were based on the ITS Architecture for Canada. The following is a description of each User Service Bundle (in bold) and the sixeen applicable User Services (in italics) as defined in the Architecture.

Traveller Information Services use advanced systems and technologies to manage information to help drivers decide when and the best route to drive, as well as reserve rides and other traveller services. For the region, *Traveller Information* and *Traveller Services* and *Reservations* are applicable.

Traffic Management Services consist of advanced systems and technologies to improve the efficiency and operation of the surface transportation infrastructure and create safer conditions for travellers. Included in this bundle are *Traffic Control, Incident Management, Environmental Conditions Management, Operations and Maintenance,* and *Automated Dynamic Warning and Enforcement*.

Public Transport Services use technology and advanced systems to improve performance, security and convenience of urban, suburban and rural transit systems. The most applicable User Service in this bundle is *Public Transport Management*.

Electronic Payment Services provide travellers with an electronic payment option for different transportation modes and services. The User Service identified as relevant to the region is *Electronic Payment Services*.

Commercial Vehicle Operations is concerned primarily with freight movement and focuses on services which improve private sector fleet management and freight mobility, and streamline government/regulatory functions. *Commercial Vehicle Electronic Clearance, Intermodal Freight Management*, and *Commercial Fleet Management* have potential applications in the Atlantic Region.

Emergency Management Services relate directly to the detection, notification and response to emergency and non-emergency incidents that take place on or adjacent to the roadway. Services applicable to the region include *Emergency Notification and Personal Security, Disaster Response and Management*, and *Emergency Vehicle Management*.

Vehicle Safety and Control Systems use sensors in vehicles and roadways to diminish both the number and severity of collisions. Services in this bundle were deemed less appropriate for the immediate needs of the region.

Information Warehousing Services include the gathering, fusion, and dissemination of weather and other data, as well as the archiving and sharing of historical transportation data. *Weather and Environmental Data Management* has potential application to the Atlantic Region.

The ITS Architecture for Canada provides a common framework for planning, defining, and integrating intelligent transportation systems.

The Strategic Plan

Strategic Actions

There are four important aspects of the Strategic Plan that must be considered when deciding to undertake a project and which stakeholders to involve. The critical Strategic Plan attributes are:

- Key Beneficiaries;
- Delivery Participants;
- Availability of Technologies; and
- Operations and Maintenance Considerations.

An analysis of these attributes identified a number of actions that could reduce institutional barriers:

- Continued regional coordination meetings among the Provinces, under the direction of the Council of Atlantic Premiers, and in coordination with other related forums, such as that for the harmonization of trucking regulations;
- Education of the purchasing agencies within the public sector owner/operators on the nature of the systems procurement process, and the distinguishing features relative to the conventional construction process;
- Pursuit of joint procurement by public agencies within the region in order to employ common equipment specifications, and take advantage of economies of scale;
- Identification and engagement of a champion(s) from the tourism industry associations and Provincial Departments of Tourism in order to help realize opportunities with traveller information services;
- Continued representation of the four Atlantic Provinces and the related transportation stakeholders as a common voice in dealing with peer agencies such as Transport Canada, and the I-95 Corridor Coalition;
- Identification of lead agencies, or joint ventures among peer agencies in order to take the initiative on multi-party, back office applications, such as that required for data warehousing and potentially electronic payment;
- Advancement of the development and deployment of various applications, such as those related to border crossings and intermodal terminals, through the scoping of pilot projects; and
- Utilization of opportunities to implement ITS applications related to commercial vehicle operations and border crossings under the Smart Borders Initiative.

Container Security

Road Weather Information Systems

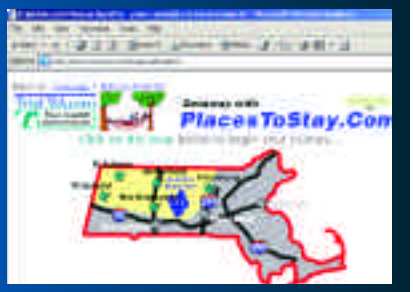
Smart Cards

The Strategic Plan

Strategic Projects

Stakeholder participation resulted in the identification of 22 Strategic Projects. The lead participants or "Champion" for each project will drive the process from strategic concept to reality. These projects are intended to directly address the transportation needs and include the potential for 'early winner' deployment to illustrate benefits. The proposed projects include:

Traveller Information Services	
TI-1	Atlantic Provinces Advanced Traveller and Tourist Information System
Traffic Management Services	
TM-1	Atlantic Provinces ARWIS Expansion
TM-2	Wildlife Detection in Atlantic Canada, Scoping Study and Pilot Project
TM-3	Implementation of Fixed Automated Spray Technology for Bridge De-icing
TM-4	Red Light Camera Pilot Project
TM-5	Portable Changeable Message Signs for Work Zones
TM-6	Smart Snowplow Expansion
TM-7	Bridge Incident Management Scoping Study
Public Transport Services	
PT-1	Urban Transit Real-Time Information Service
PT-2	Community Transit Fleet Management
Electronic Payment Services	
EP-1	Parking Electronic Payment and Monitoring
EP-2	Atlantic Canada Transaction Tag
EP-3	Smart Card Pilot Project
Commercial Vehile Operations	
CV-1	Integrated Intermodal Information System
CV-2	Atlantic Trade Corridor Border Security and Electronic Inspection
CV-3	Atlantic Canada Electronic Permitting for Oversized and Overweight Vehicles
CV-4	Port Operational Information Extranet
CV-5	Port Container Security
CV-6	Airport Groundside Transportation Management
CV-7	Commercial Fleet Management Program
Emergency Management Operations	
EM-1	Wireless Network Expansion
EM-2	Atlantic Provinces Disaster Response Plan Scoping Study



Traveller Information

Advanced Public Transportation Systems

Electronic Permitting for Oversized and Overweight Vehicles

The Strategic Plan

The Strategic Plan recommendations will promote coordinated and efficient deployment of ITS in Atlantic Canada.

Atlantic ITS Website

Deployment Program

In order to better guide the implementation, allow for evaluation of progress, and permit proper allocation of financial resources, the deployment schedules for the various projects were sub-divided into the following categories, as applicable:

- Planning, legislation and research activities;
- Design of the system or infrastructure;
- Procurement of the required technologies and pilot project installation; and/or
- Full deployment or construction of the project.

A key component of the Deployment Program is the Action Plan for Ongoing Evaluation. The goal of the Ongoing Evaluation is to provide a framework for the stewardship of the overall Atlantic Provinces Regional ITS Strategic Plan.

The specific elements include:

- Project tracking;
- A resource group to make suggestions if a project is encountering difficulties; and
- Dissemination of information on the ITS activities to stakeholders in the Atlantic Region.

The tools to be used to oversee the Action Plan include:

- Establishment of a permanent Atlantic Provinces ITS Steering Committee;
- Maintenance of the ITS Roundtable; and
- Ongoing engagement of stakeholders.

The ongoing engagement of stakeholders should be pursued through:

- Use of the Atlantic ITS website to post announcements concerning new projects, relevant events, and project progress reports. A permanent host, and website administrator will need to be established; and
- Participation in industry assocations such as ITS Canada.

A regional ITS architecture for the Atlantic Provinces would identify the functions, organizations, and information flows that are relevant to the region. Furthermore, the regional architecture provides stakeholders with customized views from their perspective, allowing for identification of integration/cooperation activities.

The Strategic Plan

Economic Development and Academic/Research

An analysis has been undertaken to identify the Economic Development and Academic/Research opportunities associated with the expansion of the ITS industrial base in Atlantic Canada. The objective of this effort was to profile the existing ITS industrial capabilities within the region in the context of the North American and world markets, and provide recommendations to strengthen the industrial base. The approach included an outreach and profiling of the relevant resources within the region, and a high level market analysis. The analysis was undertaken under the direction of an ITS Roundtable comprised of public sector, private sector and academic representation from the four Atlantic Provinces. This effort builds upon the foundations as set forth by past efforts undertaken by Transport Canada, Industry Canada, and the Atlantic Canada Opportunities Agency.

The industry scan identified 38 companies within the region that offer products or services relevant to the ITS industry. Some firms already participate in the industry, in areas such as road weather information system deployment and related services, commercial vehicle tracking and fleet management, and geographic information systems.

There is a general trend wherein the companies which are participating in the ITS market have transferred technologies from other related industries which have an industrial presence in the region. Drawing upon the resources of related companies, or partnerships with other organizations, there is the opportunity to deliver more complete applications and expand geographic reach. There is a strong network of potential support for the further development of an ITS industry in the form of industry associations (particularly information technology), centres of excellence, incubators/accelerators, and high-level academic institutions.

Post secondary training in ITS (or related fields) is offered at the University of New Brunswick, New Brunswick Community College, Dalhousie University, Memorial University, and the University of Prince Edward Island. There is benefit in linking centres into networks for collaboration and information sharing.

A review of the Atlantic industry in the context of the international ITS market yielded some key observations, as follows:

- Canada has historically been at the forefront of ITS deployment, with several examples of successful firms active in the world market. However, a recommitment to funding is required from stakeholders if Canada is to maintain its competitive advantage in the world market.
- The North American market is the most accessible and best matches the capabilities of the Atlantic ITS industry. In addition, there is potentially a very large market in the developed and emerging economies worldwide, particularly in Latin America and Southeast Asia.
- The primary weakness of most Atlantic Region firms is the relatively small size and level of capitalization in comparison to U.S. market participants.
- Increased opportunities to access the market may lie in the current efforts in the ITS industry to develop ITS standards, and through participation in international funding and marketing support initiatives.

Niche ITS areas where Atlantic Canadian resources can excel include:

- Road Weather Information Systems;
- Infrastructure Maintenance Management;
- Freight and Transit Monitoring;
- Fleet Administration; and
- Emergency Response Management.

Future Directions

Next Steps

The Strategic Planning process has been critical in terms of engaging stakeholders, rationalizing needs, and developing strategic action items for advancing the applicable ITS solutions. It should be emphasized that the plan extends beyond the strategic perspectives and identifies specific action items and a series of projects. This underscores the need to set in place and maintain a regional program to oversee the follow-on activities. It is recommended that, under the direction of the Council of Atlantic Premiers, the project Steering Committee Group remain intact beyond the course of the project to fulfill a number of functions including:

- Ongoing engagement of the stakeholder community through the ITS Atlantic.com portal and various meeting forums in an effort to oversee the enactment of strategic action items to address institutional considerations;
- Oversight and coordination in the definition and undertaking of projects contributing to the deployment plan; and
- Ongoing monitoring role to track progress against the plan.

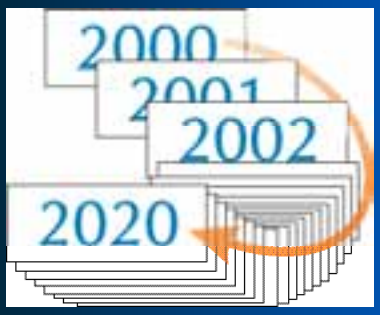
It is important that the ITS community in the Atlantic Region maintain this common point of reference, and common representation to other industry participants such as Transport Canada and the I-95 Corridor Coalition.

The Economic Development and Academic/Research analysis yielded a number of recommendations, including:

- All levels of government should continue to promote ITS applications through showcase projects in Atlantic Canada, involving local resources active in the targeted niche ITS areas.
- Private sector industry participants should exercise opportunities to access a variety of Canadian and international funding programs. Furthermore, firms should seek strategic partnerships with complementary Canadian and U.S. firms with a view to accessing the increasingly developed and well-funded U.S. ITS market.
- Selected academic institutions should explore the possibility of developing a centre of excellence for ITS focussing on the Atlantic niche areas, in partnership with other universities and private sector interests.

Entities such as ITS Canada and various regional clusters should help to reinforce the opportunities as set forth in this analysis through ongoing outreach and information exchange with the stakeholder community. Specific opportunities include the ITS Canada Annual General Meeting in early 2003 and the opportunity for the ongoing stewardship of the ITS Roundtable.

In conclusion, the plan has taken the initial steps in terms of engaging the stakeholders and undertaking analysis. Success will depend on continued involvement and actions among the stakeholders at the strategic and deployment level, under the stewardship of the Steering Committee.



The Atlantic Provinces are in a position to be a more active partner with rest of Canada and the U.S. in using advanced technology in transportation.