CASE STUDY - CANADA

The following information is based on a response to a survey carried out by the International Transport Forum on innovative policy initiatives within member countries, and countries’ efforts to promote innovation.

Briefly describe innovative policy initiatives that your government has succeeded in implementing in the transport sector in recent years. Please take the widest possible definition of innovation, including innovative technologies (e.g. ITS), policies, practices (e.g. new pricing mechanisms), etc.

Transport Canada’s Transportation Technology and Innovation Directorate works to indentify measures to increase the competitiveness, efficiency and environmental sustainability of the transportation system through strategic research and development initiatives, technology applications (including Intelligent Transportation Systems), and initiatives to address skills shortages. Innovation is key to Transport Canada’s objectives and, in particular, to reconciling the strategic outcomes (Safety and Security, Efficiency, and Environmental Responsibility) of the department’s vision of a sustainable transportation system by providing a foundation of knowledge and technology to support enhanced system performance. Innovation and skills development can make the transportation sector stronger, more resilient, adaptable and responsive to changing demands and pressures.

**ITS Policy Initiatives:**

Transport Canada undertakes research, development, deployment, and integration of Intelligent Transportation Systems. Currently, Transport Canada is updating its *Intelligent Transportation Systems Architecture* to reflect new technologies and services. Transport Canada is also developing a new tool for use and application by transportation stakeholders. The following are ITS policy initiatives that the Government of Canada succeeded in implementing in the transport sector in recent years:

- The Government of Canada recently partnered with the Government of British Columbia and regional transportation authorities to develop and implement the *Advanced Traveler Information System* (ATIS). The project consolidates data from multiple transportation agencies regarding travel conditions, schedules, etc. for various modes and border crossings. The resulting ATIS offers users a one-stop public web-portal that provides multi-modal, multi-jurisdiction, static and real-time traveler information.

- Transport Canada worked with provinces, territories and transportation associations to establish the 511 system. 511 is a designated three-digit telephone number that provides real-time travel and weather information. The types of information available through the
511 system include: winter road conditions, road work, major incidents, weather alerts, and waiting times at border crossings. 511 can help tourists and travelers, including commercial vehicle operators, better plan their trips. In 2008, Nova Scotia, Yukon and Quebec launched 511 traveler information services, providing service free of charge in both English and French.

- Transport Canada developed a Fatigue Risk Management System for Canadian Aviation to provide a “toolbox” for guides, templates, training materials, etc. to help companies develop their own fatigue risk management policies and practices.

- The Government of Canada partnered with provinces and territories to develop the Road Weather Information System (RWIS). RWIS is a system of sensors embedded in and below the road surface and on nearby towers that collect detailed data on air temperature, relative humidity, wind direction and precipitation. This data is used to make forecasts regarding icing conditions and in turn, provide critical information to road maintenance authorities. As a result of the federal RWIS initiative in Canada, 134 new RWIS stations have been installed along the National Highway System. An additional 12 stations have been deployed on other roadways identified by provinces and territories.

**Skills Policy Initiatives:**

The Canadian transportation sector is fast becoming a knowledge-based sector where innovation, research and development, and science and technology are critical to forming public policy, supporting transportation agencies’ legislative/regulatory mandates, and developing a highly qualified workforce best able to tackle emerging challenges to maintain and enhance a safe, secure, efficient, and environmentally responsible transportation system. An efficient, modern, and adaptable transportation system, including both “hard” (bricks and mortar) and “soft” (Information and Communication Technology (ICT)) transportation infrastructure, as well as balanced policies (or policy approaches), has been, and continues to be, important to sustained economic growth.

A highly skilled, knowledgeable and innovative workforce will be essential for the efficient and effective operation of Canada’s key gateway and trade corridor. An innovative workforce for Canada’s strategic gateways and trade corridors will require specialized training and education in transportation skills, logistics, and supply chain management. Addressing skills development challenges will require a coordinated approach among different levels of government, the academic sector and industry. Canada’s Gateways, specifically under the Asia-Pacific Gateway and Corridor Initiative, have established the Asia-Pacific Gateway Skills Table. The Skills Table will contribute to addressing concerns expressed by local and international stakeholders regarding the competitiveness and reliability of Canada’s gateway and trade corridor by addressing skills and labour shortage issues.

**Innovation and Value-added Initiatives:**

Transportation, logistics and supply chain management generate economic value for the economy, require a skilled workforce and a sound research and development (R&D) foundation that all support innovation. In an era of economic integration and global value chain, Canada faces the challenge to create and retain economic value within its own boundaries by enhancing its competitiveness. Through its national gateways and trade corridors, Canada is well positioned to take advantage of the significant opportunities available to increase wealth generation, job creation and sustained long-term economic growth. To this end, the Government of Canada’s Value-Added Gateway Strategy is designed to extract maximum value
from gateway-related investments by fostering entrepreneurship and an innovative business culture. This is done through a variety of non-infrastructure measures that enhance business friendliness and encourage both domestic and foreign talent to contribute to the gateway economy, such as improved coordination, innovation, ICT, regulatory streamlining, attracting foreign investments, etc.

**Value added Gateways:**

Viewing freight transportation policy through the Gateway concept lens allowed the Government to view all modes concurrently. That approach optimizes the synergies between all of the modes and ensures fluid intermodal connections that facilitate system integration thus contributing to supply chains that have the flexibility to respond quickly to changing conditions.

Trying to build a common national strategy among the diverse interests found in thirteen sub-national jurisdictions has proven to be almost impossible as too many compromises are necessary. The Gateway approach of “thinking globally while acting regionally” is a practical way of developing effective regional freight transportation strategies directed at trade and travel volumes of national significance. These, in turn, could eventually be integrated into a national freight strategy reflecting regional realities and geographic advantages.

**Transportation Technology, R&D:**

Transport Canada continues to improve the department’s ability to understand and respond to current and emerging challenges through the development, investigation and implementation of technological solutions. R&D positions the department to optimize the safety, security, efficiency and environmental responsibility of Canada’s transportation system. An important lens for R&D activity includes the design, building and maintenance of a smarter transportation system. Work in this area will inform and protect the Government’s infrastructure investments over the long-term. In 2008-2009, R&D undertaken to support our safety and security mandate will be complemented by and/or integrated into other research and development work focused on key departmental research priorities such as improving transportation in gateways and corridors and the North, to increase accessibility and energy efficiency, and working with stakeholders to minimize the environmental footprint of transportation.

Collaborative work with R&D experts in industry, academia and government will continue to be an important component of Transport Canada’s R&D agenda as the department seeks to encourage the development, demonstration and commercialization of innovative technological solutions to Canada’s transportation challenges. New R&D activities will support national transportation objectives and strengthen the department’s response to emerging issues through the development and application of technological solutions. One of the long-term results of these efforts will be to increase research and technological capacity related to transportation among industry and academic stakeholders. This will include the North.

**Electric and Urban Mobility:**

Transport Canada is working with key partners in industry, academia and government to resolve critical technical issues, through research and development, for the advancement of electric drive transportation and urban transit vehicle technology and commercial deployment. Key priority areas under the Electric Mobility Program include electrical storage development, electric drive components development, powertrain optimization, development of relevant codes, standards and regulations and outreach. The Urban Transportation Technology
Development Program includes all surface transportation in the urban context such as transit and shuttle buses, medium and heavy duty fleet vehicles as well as passenger fleet vehicles. Key priority areas include vehicle weight reduction, electrification, clean propulsion and powertrain optimization.

Surface Security Initiatives:

The Government of Canada’s 3-year Transit-Secure contribution program, designed to enhance operator security in passenger rail and urban transit, ended March 31st, 2009. The program funded operators in the development of security plans and risk assessments, as well as other innovative security enhancements including:

- Enhanced information sharing technology (e.g. purchasing communication encryption software/equipment to enable intelligence sharing);
- Training (including in-house exercises) and employee awareness;
- Public awareness;
- Enhanced surveillance technologies;
- Technology trials;
- Physical security enhancements, including measures to reduce collateral damage from attacks; and
- Inter-operable communications equipment

As part of the same initiative, Transport Canada undertook a pilot project to determine the usefulness and feasibility of conducting blast vulnerability assessments of specific critical infrastructure in this transportation mode in partnership with the Canadian Explosives Research Laboratory at Natural Resources Canada, and Owners/Operators of the facilities.

Transport Canada is strategically partnering with industry and stakeholders to transform the safety and security culture to one where safe and secure practices are common and risk management is practiced daily. Until recently, most efforts to prevent accidents and incidents were rooted in setting standards and enforcing regulations. Although effective, there is growing evidence that an organization can comply with regulations and still be unsafe or unsecure. As a result, new risk-based, performance-based, and systems-wide solutions were developed. Safety and Security Management Systems were born.

Safety Management Systems (SMS) and Security Management Systems (SeMS) are based on the fact that there will always be hazards, risk and threats. Therefore, systematic and proactive management is needed to identify and control them before they lead to accidents or incidents. Transport Canada defines SMS/SeMS to be a formalized framework for integrating safety/security into the daily operations of a transportation enterprise. Conceptually, SMS/SeMS focuses on two key strategies: ensuring compliance and preventing and/or reducing harm arising out of an organization’s decisions and operations; and, focusing on systematizing management functions and processes to enhance or optimise organizational performance.

What initiative(s) does your country have to promote innovation in the transport sector? Are these initiatives part of a larger effort to promote innovation across the economy? Please provide any additional material you have regarding these initiatives, including web sites, reports, etc.

Transport Canada is in the midst of developing a comprehensive Transportation Innovation Strategy to focus the department’s interactions with the transportation sector with respect to the development, promotion and implementation of innovative transportation products,
processes and services. The department is hosting an Innovation Roundtable on October 16, 2009, that will bring together recognized innovation experts, transportation industry executives, senior government officials, and research and innovation policy-makers to create alignment around core concepts for transportation innovation. The Roundtable will explore models to foster innovation in the transportation sector, and share experiences on issues such as stewardship, partnership, and business perspectives on innovation.

Although the Transportation Innovation Strategy will complement the Federal Science & Technology (S&T) Strategy, it is not part of a formal Government of Canada initiative. The Federal S&T Strategy identifies four main priorities for S&T:

- Environmental science and technologies;
- Natural resources and energy;
- Health and related life science and technologies; and
- Information and communications technologies.

Several other federal science-based departments and agencies have completed, or are in the process of developing, S&T or Innovation strategies. These include Natural Resources Canada, Environment Canada, Agriculture & Agrifood Canada, and Health Canada.

Transport Canada’s Intelligent Transportation Systems (ITS) Policy Branch also developed a Strategic Plan (to be released) entitled Transforming Transportation. This Plan establishes a framework for Transport Canada’s leadership role in ITS over the next five years. Supporting and fostering innovation is a key component of this role and is reflected in the Plan’s five strategic objectives:

- Maintaining and upgrading Canada’s ITS Architecture
- Promoting the integration of ITS networks
- Supporting research and development
- Promoting a culture of participation
- Fostering international cooperation.

These objectives support Transport Canada’s mission, which is to help meet current transportation challenges, encourage the mainstreaming of ITS and the integration of ITS across Canada, and support the development of innovative wireless and sensor technologies.

Transport Canada’s Transit-Secure contribution program promotes innovation in security for the passenger rail and urban transit sector. Please see 1.1 for details.

Transport Canada’s ecoMOBILITY program is part of the Government of Canada’s ecotransport strategy to address greenhouse gas emissions and air pollution from transportation sources. The program promotes innovation in the transportation sector through two main types of activities:

- Financial support for transportation demand management projects. The program provides financial support to municipalities and regional transportation authorities for transportation demand management (TDM) projects that reduce emissions by shifting personal automobile travel to other modes, reducing the number and length of car trips, and shifting trips to less congested times and routes.
- Research and information to build capacity to implement TDM. The program will build national capacity to implement TDM measures through research, training and the development of resources. In particular, ecoMOBILITY is helping to adapt and implement sustainable transportation practices in a Canadian context.

More information on the ecoMOBILITY program can be found online at www.tc.gc.ca/ecomobility. The website also contains links to case studies, best practices, reports, and program implementation guides.

Transport Canada’s ecoFREIGHT program is also part of the Government of Canada’s ecotransport and promotes innovation in the transportation sector through three components: The Freight Technology Demonstration Fund, the Freight Technology Incentives Program, and the Marine Shore Power. The program provides funding to test and purchase new and underused freight transportation technologies.

More information on the ecoFREIGHT program can be found online at www.tc.gc.ca/ecofreight. The website also contains links to case studies and program implementation guides.

What are the specific objectives of these initiatives? (e.g. Do they focus on certain challenges, such as climate change or safety, or on certain modes? Do they take a wider approach focusing on all of the challenges faced by transport?)

Canada’s Transportation Innovation Strategy is intended to better position the transportation sector with respect to departmental and Government of Canada priorities for technology and innovation, and to incentivize the sector to implement forward-looking solutions to challenges facing the Canadian transportation system. To this end, Transport Canada has an important leadership role to act as a knowledge broker, catalyst and facilitator to advance an innovation strategy that serves to:

- Focus transportation technology and innovation efforts on strategic priorities of national significance identified by the department, the transportation sector and the federal government.
- Focus and intensify collaboration with industry, universities and research institutes, other government departments, provinces and international organizations to accrue a number of benefits, including: improved joint planning and collective identification and funding of priority areas; improved efficiency and accountability; and optimization of resources. A major objective in working through engagement and partnerships is to ensure that essential capacities and capabilities are developed to support strategic priorities.
- Identify and prioritize Canadian collaborations with universities and research institutes in order to better align research and innovative policy development and implementation efforts with existing and emerging strategic priorities. The creation of research networks of excellence, where sufficient capacity already exists and can be enhanced, will have a catalytic effect for collaboration and investment from stakeholders. It will also create focal points to attract and access international research and intelligence to enable Canadian transportation to adapt and build on R&D and technology deployment done elsewhere.
The objectives of the **Transit-Secure** initiative are as follows:

- Support the government’s national security platform commitments, and the *National Security Policy* objective to contribute to the security of the North American transportation system by enhancing the security of Canada’s passenger rail and urban transit systems.

- Provide an incentive for operators of passenger rail and urban transit services to implement new and enhanced security measures rapidly.

- Support the adoption by operators of relevant national and international best practices and guidelines for security enhancements.

The ecoMOBILITY program aims to reduce emissions from the urban passenger transportation sector by helping municipalities attract residents to less polluting forms of transportation. By increasing the modal share of transportation options such as walking, cycling, public transit and ridesharing (e.g. carpools), harmful emissions can be reduced and other challenges such as congestion and personal health can be addressed.

The ecoFREIGHT program is aimed at reducing the environmental and health effects of freight transportation through the use of technology by helping the freight transportation sector through funding programs and information sharing to demonstrate and purchase new or underutilized technologies, or being better informed of their modal choice.

Safety and Security Management Systems aim to change the safety and security culture so that the transportation system contributes to Canada’s social development and security objectives. This approach represents a major cultural shift and will require substantial effort and time to be fully realized. But by doing so, people at all levels of the transportation system will actively manage risks and threats in their day-to-day activities.

**Please describe the funding arrangements associated with your efforts to promote innovation in transport:**

Transport Canada’s R&D Central Fund supports short- and long-term multimodal technology development in specific areas of strategic importance. Project proponents apply through an internal call for proposals (proposals must be made by a Transport Canada employee but often involve external stakeholders). Proposals are evaluated by a selection committee, guided by a set of weighted evaluation criteria that include:

- Potential impacts and benefits to Canadians;
- Relevance and urgency of the work;
- Partnerships, leveraging of resources, cost-sharing
- Interoperability
- Deliverables, cost estimates and time frames; and
- Risk analysis and mitigation strategies.

In addition, the department uses other internal funding sources to bolster it’s R&D program. To date, Transport Canada has not captured departmental spending on other non-technology based innovation.

Funding for the **Transit-Secure** program was provided for specific projects proposed by operators. Up to 75% of the costs of projects approved were funded by Transport Canada. The program had four rounds of funding. Each round involved a call for applications, guidelines and two review committees to evaluate and approve applications.
The ecoMOBILITY program provides financial support to a number of Canadian municipalities to test or adapt Transportation Demand Management (TDM) approaches. The outcome of the program will be a number of lessons learned and best practices on the success factors of TDM in the Canadian context. Those best practices will be disseminated to municipal practitioners and decision-makers to advance the uptake of TDM in Canadian municipalities.

Municipalities receive between $40K and $800K to cover up to 50% of their project expenses, in the form of Contributions. The municipalities were chosen via two request for proposals and the projects will take place between January 2009 and December 2011.

The ecoFREIGHT program provides financial support to a number of Canadian companies to test or adopt new or underutilized technologies. The outcome of the program will be a number of lessons learned and best practices that will be disseminated back to the industry through web-based network, workshops or conferences. Companies receive between up to $500K to cover up to 50% of their project expenses, in the form of Contributions. The projects were chosen via two request for proposals and they are taking place until December 2011.

**What is the lead ministry or agency for your efforts to promote innovation in transport?**

Transport Canada

**What other public entities are involved and what are their roles?**

Transport Canada partners with other federal departments on collaborative R&D projects that promote innovation in transport, such as:

- Environment Canada (on environmental issues)
- Natural Resources Canada (on energy and fuels)
- Infrastructure Canada
- The National Research Council
- Industry Canada (on issues related to the transportation industry - i.e. Auto and Freight sector)
- Natural Sciences and Engineering Research Council (granting agency)

Because of Canada’s federal system, the Government of Canada commonly works with provincial and territorial governments to implement and deploy transportation projects across the country or in specific regions.

Regarding Safety and Security Management Systems, Transport Canada partners with other federal departments, such as:

- Fisheries and Oceans Canada (Canadian Coast Guard)
- National Defence
- Standards Council of Canada
- Department of Public Safety, and its portfolio agencies (Canada Border Services Agency, Royal Canadian Mounted Police, and the Canadian Security Intelligence Service).
What other partners are involved (e.g. the private sector, universities, states/provinces, etc.)?

Given that Canada shares jurisdiction over transportation with other levels of government, Transport Canada commonly works with provincial and territorial governments when developing its regulatory frameworks and funding partnerships.

Transport Canada’s R&D program includes widespread partnerships and collaboration with private companies, universities, colleges and other transportation and/or research organizations. The department houses world-class transportation specialists, but boasts no labs, so most work is collaborative or contractual in nature. Leveraging of financial resources, either directly or in-kind, is strongly encouraged with partners to secure federal funding from all departments in the federal government.

Other public entities involved in the Transit-Secure program are all rail and urban transit operators who were funded in the program. Their role involved applying for funding, and implementing the projects they proposed.

Other partners involved in Safety and Security Management Systems include all modal transportation operators, industry stakeholders, and transportation unions.

What international partnerships are involved in this?

Transport Canada has formal joint science and technology agreements with other countries such as China, the United States and South Korea, some of which include specific provisions for transportation R&D. Transport Canada also works with international partners on a project-by-project basis to conduct R&D and/or ITS projects.

Transport Canada actively participates in the Intermodal and Intelligent Transportation Systems Expert Group, within the Asia-Pacific Economic Cooperation (APEC) Transportation Working Group. Through this multilateral forum Canada cooperates with Asia-Pacific countries to promote and facilitate the use of innovative transportation systems, including satellite navigation and electronic commerce technologies as well as intelligent transportation systems, to assist in establishing efficient, safe, secure and environmentally sustainable transportation systems in the region. Transport Canada also plays a lead role in promoting efficient intermodal transportation, including through gateways and corridors integration and supply chain connectivity models.

Several international partners and bodies are involved with Safety and Security Management Systems, including the United States of America (Federal Aviation Administration), the United Kingdom (Her Majesty’s Railway Inspectorate), the International Organization for Standardization, the International Maritime Organization, the International Civil Aviation Organization, and the G8 Roma/Lyon Group.

Please provide a summary of any results or outcomes already achieved as a result of your efforts to promote innovation in transport?

The Department works in cooperation with industry, academia and other levels of government to proactively identify and address regulatory and/or technical barriers.

Public outreach and the showcasing of innovative technologies, best practices and other exemplary work has been done in the rail, urban transit, passenger vehicle and other sectors.
Please describe the performance indicators or measurements that you use to evaluate the outcomes of your efforts to promote innovation. Please attach more detailed documents on this issue, if they are available.

As a representative example, the Transit-Secure contribution program is evaluated on the basis of its relevance and need, its success and impacts, and its cost-effectiveness. A mix of interviews, file review, risk assessments and other tools are used to measure the program’s outputs.

What are the principal means by which your agency keeps track of new innovations and trends in transport?

Transport Canada employs a variety of methods to keep track of new innovations and trends in transport.

The Transportation Technology and Innovation Directorate is responsible for gathering and disseminating information concerning transportation innovation, and monitors new developments in the following ways:

- The Transportation Development Centre (TDC) - a subgroup of the Directorate - issues information sheets on various innovation projects that Transport Canada is involved in, and manages a multimodal R&D program aimed at improving Canada’s transportation sector through innovation.
- The Directorate compiles an Annual R&D Report.
- The Directorate carries out a knowledge broker role (e.g. information, intelligence and analysis of international trends and developments as regards transportation technology and innovation.

In addition, the department’s transportation engineers and specialists maintain extensive networks of experts in the public and private sectors and academia, helping the department implement its R&D/Policy programs, and keeping Transport Canada abreast of current developments in innovation.

Transport Canada’s Socio-Economic Research Inventory maintains an annual list of research being conducted by the department on socio-economic issues.

Innovations in light-duty vehicles are monitored by departmental programs that proactively identify promising technologies and work in cooperation with industry to encourage their introduction in Canada. (e.g. ecoTECHNOLOGY for Vehicles www.tc.gc.ca/eTV).