

# Defining the Problem: Developing Innovative Technological Solutions

## Future of Trucking Symposium

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# The Role of Intelligent Transportation Systems

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February 18, 2010



# What is ITS?

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**i**ntelligent

**t**ransportation

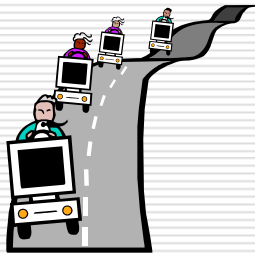
**s**ystems

- Definition
- Description
- Trucking Applications
- Benefits to Industry

# ITS

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- The integrated application of advanced sensor, computer, electronics, and communications technologies and management strategies to increase the safety and efficiency of the transportation system



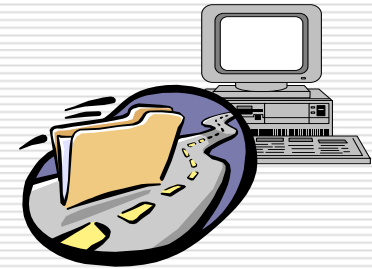
**People**

+



**Goods**

+



**Information**

- Considers interaction and provides an intelligent link between travelers, vehicles, and the infrastructure

# ITS is...simply put...

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- Lives...*
- Time..*
- Money...*
- Energy...and...*
- The Environment...our future*

# Why ITS, and Why in Trucking?

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- ❑ Technology explosion
- ❑ Unparalleled growth in movement of people and goods
- ❑ Supply chain linkages require precision
- ❑ Sustainability considerations
- ❑ Increasing data complexities
- ❑ Better use of existing infrastructure

# Modes Affected

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- Truck, car, bus, urban transit
- Rail
- Marine
- Air



# ITS Segments for Trucking

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1. Traveller Information
2. Traffic Management
3. Electronic Payment
4. Vehicle Safety and Control Systems
5. Operations



All impact the trucking sector directly or indirectly

# 1. Traveller (Trucker) Information

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- ✓ Route guidance / navigation
  - navigable map databases
  - voice guidance / graphic display
  - 'social networking' channels
  - digital short range communications
  
- ✓ Vehicle and freight clearance
- ✓ Efficiency and safety



# Alberta Example

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## AMA Camera Reports

**Highway 16: East of Century Road Overpass  
Near Spruce Grove**

Friday, September 21, 2007, at 13:10



[Angle 1](#) | [Angle 2](#) | [Angle 3](#)

<b>Air Temperature:</b>	12.5 °C
<b>Pavement Temperature:</b>	18.7 °C
<b>Wind Speed:</b>	14.4 km/h
<b>Wind Direction:</b>	SSW
<b>Relative Humidity:</b>	56 %



[Camera Service Disclaimer](#)

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# BC...

The screenshot displays the iMove Lab website interface. At the top, the logo "iMove Lab" is accompanied by the tagline "Intelligence in motion". Navigation links include "Trip Calculations", "Weather", and "Search". A secondary navigation bar features tabs for "Motorists", "Transit", "Cycling", "Inter-Regional", "Visitors", and "Commercial". The date "May 29, 2007" is shown. A sidebar on the left lists search and information categories such as "Search Advisories", "Search Groups of Cameras", "Search Individual Cameras", "Search Bus Routes", "Map, Cameras, Advisories", "Drive BC Traveller Information", "Highways", "Bridges and Tunnels", "Parking Information", "Park and Ride", "Border Crossings", "Taxis", and "Jack Bell Ride-Share". The main content area features an "Interactive Map" with a toolbar containing icons for "Events", "Cameras", "Weather", "Roads", "Transit", "Commercial", "Marine", "Air", "Rail", and "Cycling". The map itself shows the Greater Vancouver region with various cities and landmarks labeled, including Sunshine Coast, Bowen Island, West Vancouver, North Vancouver, Vancouver, Burrard Inlet, Port Coquitlam, Coquitlam, Maple Ridge, Burnaby, Surrey, Pitt Meadows, Richmond, Delta, Langley, Aldergrove, Mission, White Rock, Blaine, Birch Bay, Lynden, and Delta. A scale bar indicates 10 miles and 20 kilometers. The map is powered by Google and includes a copyright notice for 2007 TeleAtlas.

iMove® - Metro Vancouver's integrated, multi-modal web portal for traveller information

# 2. Traffic Management

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## Traffic Control – Urban Pioneer Canada

- ❑ 1959 - world's first computerized traffic control
- ❑ 1964 - world's first full-scale digital traffic signals
- ❑ 1997 - world's first all-electronic, open access urban toll highway (ETR 407)



# 3. Electronic Payment

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- ✓ Seamless operation and system interoperability
- ✓ Smart cards
  - tolls on highways and bridges; manage financial process
  - calculate and manage any number of charges



# 4. Vehicle Safety and Control

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## Advanced Driver Assistance Systems (ADAS)

- Road / vehicle / driver interface: precise vehicle position information and motion relative to an accurate digital model of the roadway
- Applications
  - Curve Warning
  - Upcoming Intersections
  - Anomalies



# 5. Operations

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- Customs clearance
- On-board safety monitoring
- Intermodal management
- Automated roadside inspection
- Hazardous materials/dangerous goods tracking
- Anomaly alerts (driver, route, weather)
- Fleet management



# Let's Look at Emerging Applications...

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- ❑ IntelliDrive<sup>SM</sup> applications
- ❑ Transponder technologies
  - Weigh in Motion (WIM)
  - Application of Radio Frequency ID (RFID)
  - Automated License Plate Reading (ALPR)

# IntelliDrive...

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- ❑ Previously “VII”. Enable V2V and V2I real-time
- ❑ Imbedding of sensors in both
- ❑ US DOT has 2014 objective to deploy across the USA. Multi-billion \$\$ budgets
- ❑ EU Highly Automated Vehicles for Intelligent Transport (HAVEit) project - \$40 million this year
- ❑ Commercial Applications include:
  - Safety: driver condition, collision avoidance, curve speed warning, trucker advisory
  - Travel Information: route selection, travel times, road conditions, collision avoidance, distress
  - Wireless Safety Inspection: brakes, lighting, logbook, hours of service, hours to service

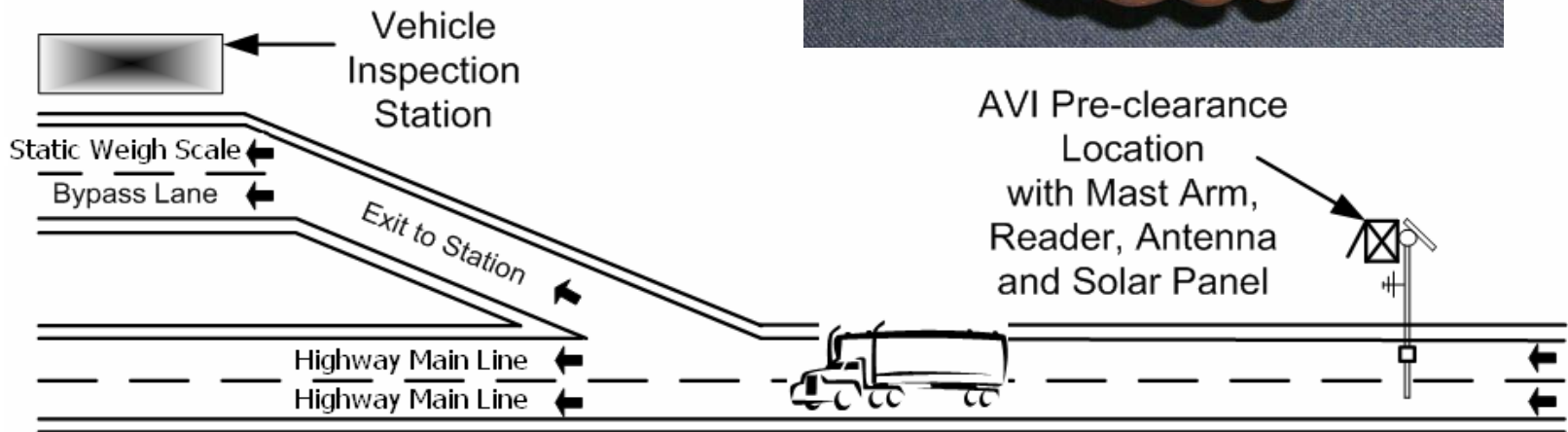
# Transponder Technologies...

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- ❑ 3 components: transponder, reader, IT
- ❑ RFID picks up signal and reports back
- ❑ Transponders can be active or passive
- ❑ Proven technology
- ❑ Now with smart cards for payments (tolls, other)
- ❑ The sky is the limit if savings proven

# AVI (Automatic Vehicle Identification) Technology

- In-vehicle transponders



# Transponder Technology cont'd

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- ❑ Significant savings in time and operating costs
- ❑ HELP Partnership: Operators and Govt Agencies in USA
- ❑ Merging with East Coast E-ZPass
- ❑ Regulatory pre-clearance and tolls currently
- ❑ Border crossings under negotiation
- ❑ 10 year Pre-Pass study (1997-2007):
  - 20 million hours avoided
  - 120 million gallons of fuel saved
  - \$1.1 billion op costs savings (at \$5/stop)

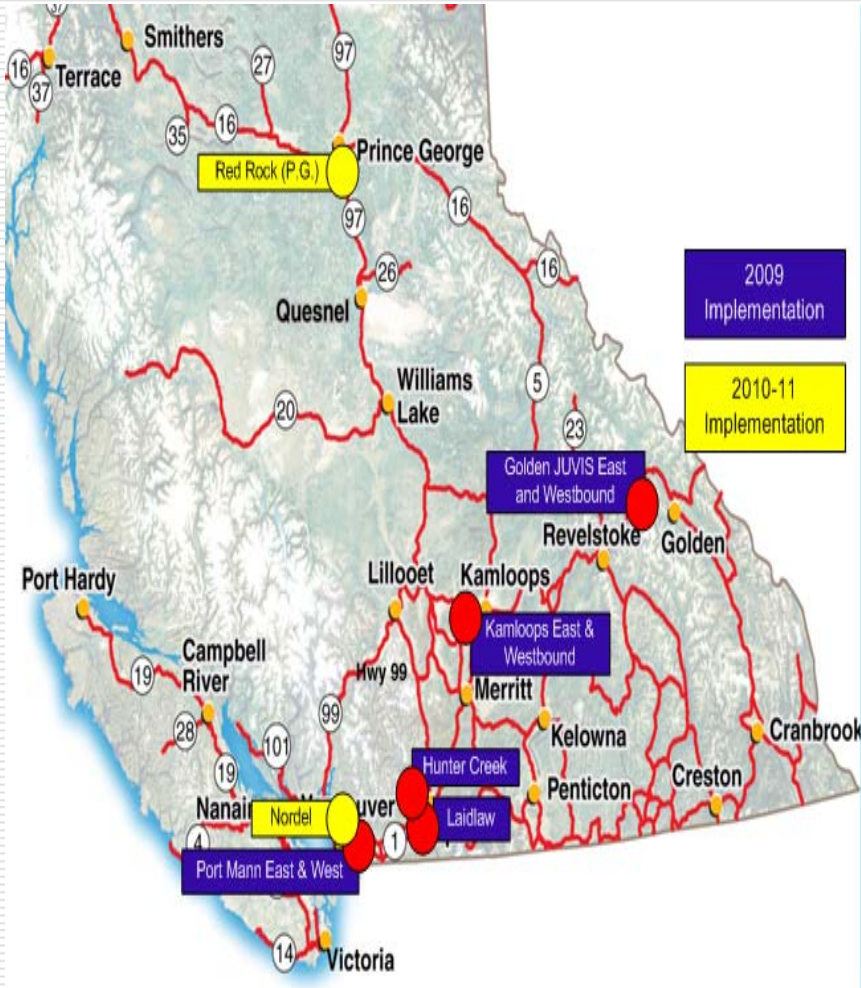
# Canadian Examples

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- Two Preclearance Programs in Western Canada
  - Weigh2GoBC
  - Alberta PIC (Partners In Compliance)
- ITS member (International Road Dynamics Inc.) supplied the equipment and integrated the weigh station systems
- Purpose – allow compliant commercial vehicles to bypass weigh stations
  - Increased Safety and Efficiency
  - Improved Carrier Productivity and Operational Hard Dollar Savings
  - Fuel Savings and Environmental Benefits



# Weigh2GoBC & Alberta PIC Sites



# AVI SITE IN BC

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# WEIGH-IN-MOTION (WIM)

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- ❑ BC and Alberta Pre-Clearance Systems are designed to include WIM now or in the future.
- ❑ WIM sites at Golden, Prince George\*, and Hope\* in BC

\* To be installed in future.



# Weigh2GoBC Projected Benefits

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## Projected Ten Year Benefits

- ❑ Driver time savings 387,000 hours
- ❑ Fuel savings of 2.4M litres
- ❑ Greenhouse gas reductions 6.5 million kilograms



Source: Weigh2GoBC

# Cross Border...

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- ❑ Free and Secure Transport Program (FAST)
- ❑ Outcome of 911 Security-based congestion
- ❑ Dedicated RFID lanes at borders
- ❑ Transport Canada and US DOT securing further bilateral arrangements

# ITS Benefits to Trucking...

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- ❑ Time savings & operational efficiencies (\$\$)
- ❑ Reduced fuel consumption & emissions (\$\$)
- ❑ Reduced collisions and fatalities (\$\$)
- ❑ Increased safety and personal security
- ❑ Reduced congestion. Sustainability
- ❑ Enhanced economic productivity (\$\$)
- ❑ Improved information sharing

# A Few More Bottom Line Examples...

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## Traffic Management Systems

- ❑ Significant installed base in North America
  - RESCU and COMPASS, Toronto
  - Expressway Surveillance and Control, Montreal
- ❑ Increases in throughput up to 25%
  - Equivalent to adding one lane to four lane section
  - Travel time reductions up to 25%
- ❑ Regina, Saskatchewan - advanced traffic management systems resulted in:
  - decreased travel time on 8 of 10 routes (12%)
  - fuel consumption and emissions improvements from 23.84% to 41.46%



# Examples.....cont'd

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## Traffic Management Systems

- Toronto's COMPASS Freeway Traffic Management System
  - Reduced incident duration from occurrence to clearance from 86 to 21 minutes
  - Reduced delays by 5.3 million annual vehicle-hours and annual fuel usage by 11.3 million litres
  - Incident display messages prevented approximately 200 additional accidents annually
  - Annual emission reduction of 3100 tonnes
  - Saves commercial vehicle operators \$55M annually





# The Economic Implications

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- Canada-U.S. Border Crossings
  - Largest bilateral relationship on the globe
  - Customs pre-clearance (RF and Microwave)
  - Faster movement in all corridors
    - CalTrans, HELP, E-ZPass Pilots
    - Asia-Pacific, Continental and Atlantic Gateways
  - Security and Safety
- Domestic
  - Productivity
  - Cost reductions

# ITS: The Canadian Vision

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- ❑ Improve safety of Canada's ground transportation
- ❑ Increase operational efficiency and effectiveness of ground transportation system
- ❑ Reduce energy and environmental costs associated with ground transportation
- ❑ Enhance productivity and competitiveness
- ❑ Improve data integration for planning, program management and evaluation, traffic operations, enforcement
- ❑ Enhance personal mobility, convenience and security of the ground transportation system
- ❑ Create future opportunities for Canadian companies in the global market place

# Questions?

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