Ontario – Québec
Smart Corridor | Corridor Intelligent

Concept of Operations
Stakeholder Workshop Series I
June, 2011

IBI GROUP ROCHE

Ontario Québec Canada

Agenda

- Introductions
- Background
- SWOT Analysis Breakout
- Break
- SWOT Plenary Session
- Systems and Solutions Analysis Breakout
- Systems and Solutions Plenary Session
- Next Steps

INTRODUCTIONS

Introductions

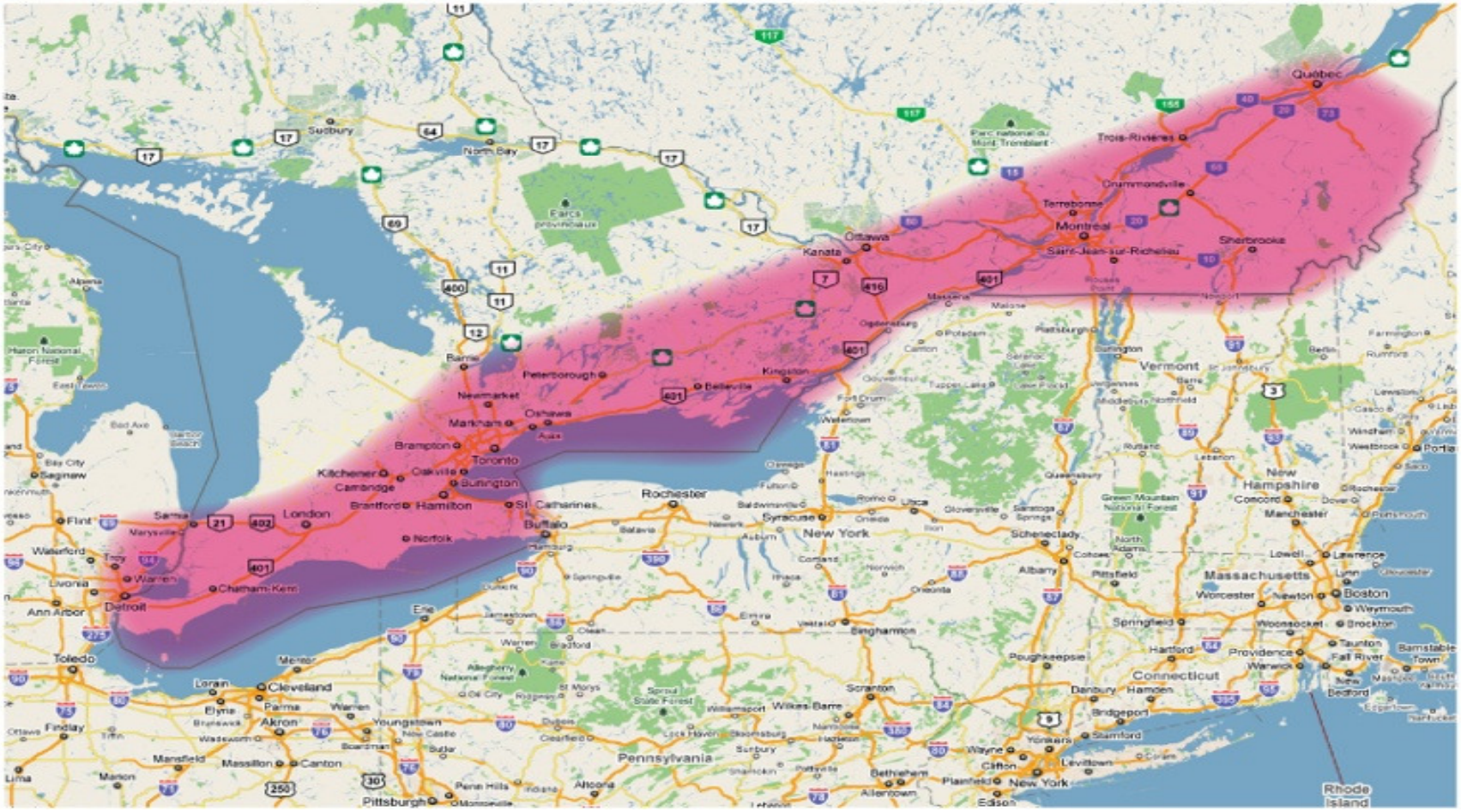
- Project Team

- Stakeholder Participants
  - Who you are
  - Who you represent
  - What is your interest in project

BACKGROUND

What is the Ontario-Québec Corridor?

- Smart Corridor extending from Windsor to Québec City, and south to the Canada/U.S. border



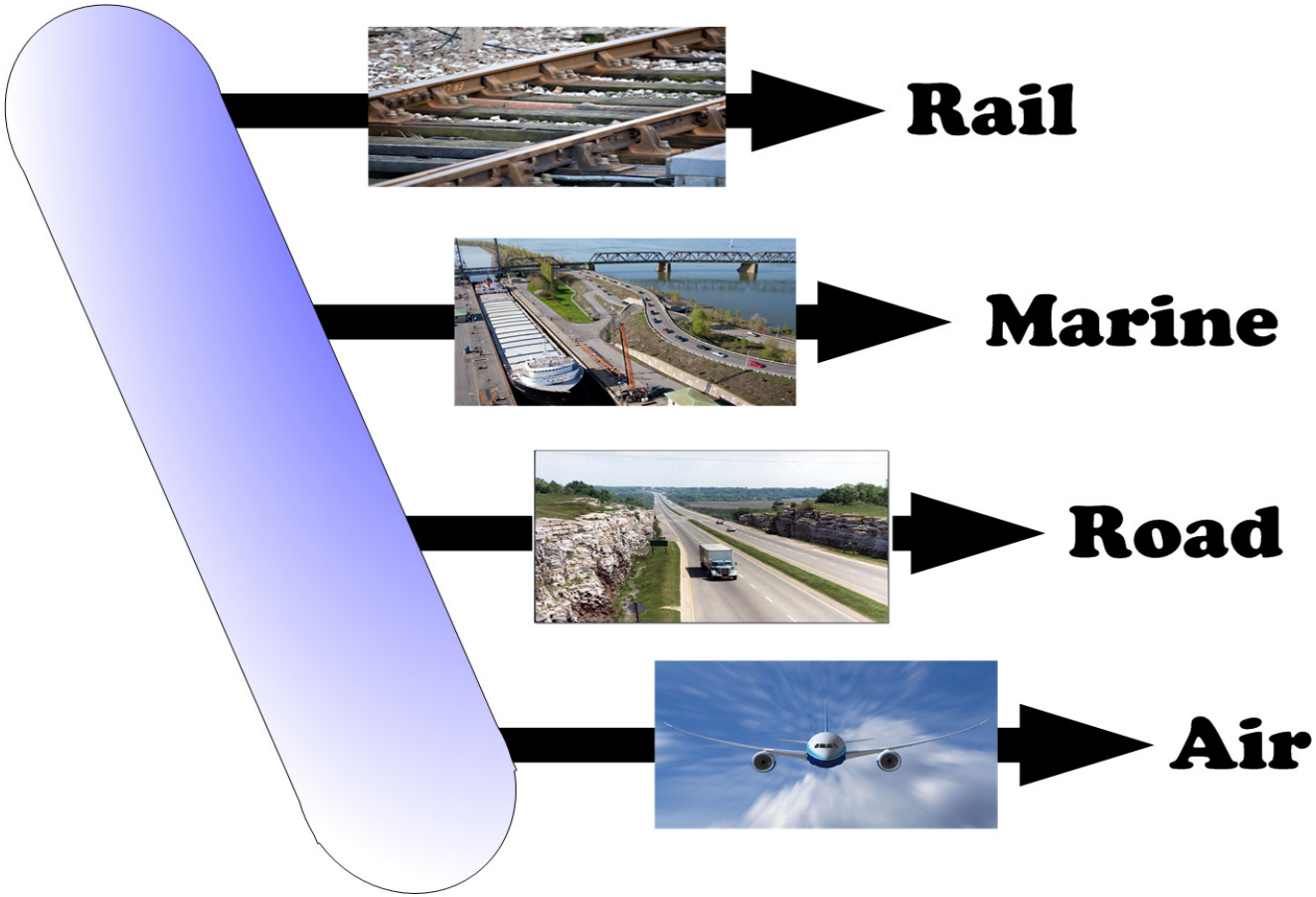
Why are you here?

- Stakeholder Outreach
  - *Concept of Operations and underlying Regional ITS Architecture will be developed through stakeholder consultation to represent a consensus roadmap for how various ITS elements can work together*

SECTORS:

- **Carriers, shippers, logistics providers, terminal operators;**
- **Public sector transportation authorities;**
- **International border authorities;**
- **Information service providers;**
- **Academia.**

- Transportation Mode Infrastructure



- *Sustainable, secure and efficient multimodal transportation*

- Centres / Facilities

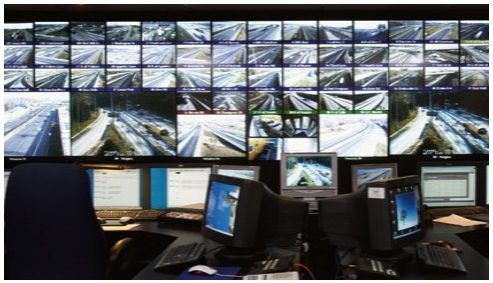
- *Competitive, attractive for investment, and essential for trade*

What is a Smart Corridor?

- What makes a Corridor "Smart"?
  - *Applying new and emerging technologies to improve operational efficiency.*
  - *Share information among systems to achieve benefits of coordinated operations*

Examples

1. **Electronic filing of credentials/reporting;**
2. **Automated means of inspection;**
3. **Automated authentication of vehicles, cargo, and personnel;**
4. **Seamless electronic transactions/payments;**
5. **Terminal reservations;**
6. **Dangerous goods tracking; and**
7. **Readily accessible current/predictive travel conditions information.**

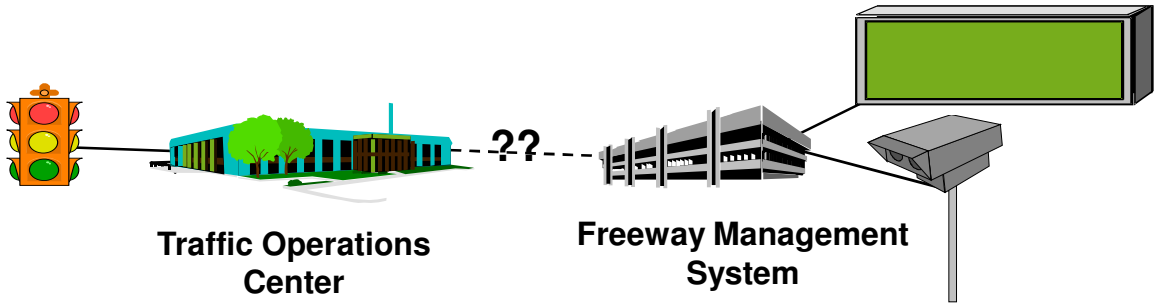


What are Intelligent Transportation Systems (ITS)?

"Interactive systems for the collection, processing and dissemination of information applied to the field of transportation, based upon the integration of information and communication technologies into infrastructure and vehicles in order to improve the management and operation of transportation networks and associated user services"

Why an Architecture, and Concept of Operations, for the Corridor?

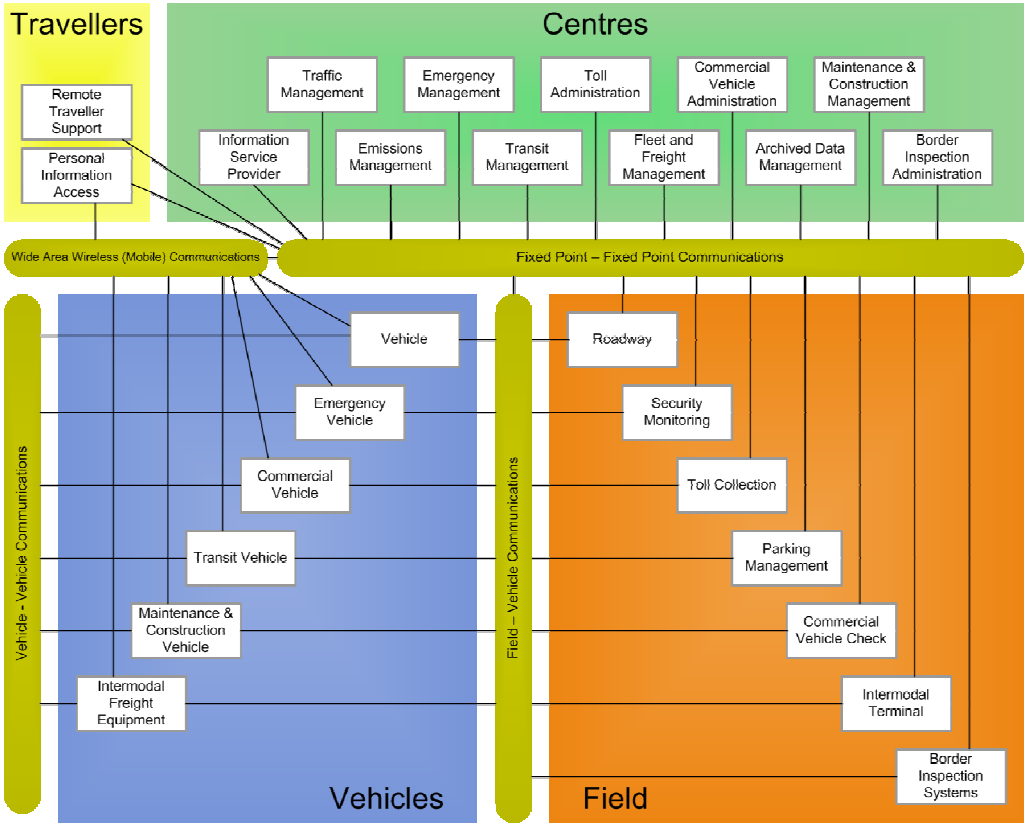
- Identify integration opportunities
- Efficiently structure implementations
- Incorporate operations & management into decision making
- Encourage stakeholder buy-in
- Identify gaps in existing services



PROCESS TO DEFINE CONCEPT OF OPERATIONS

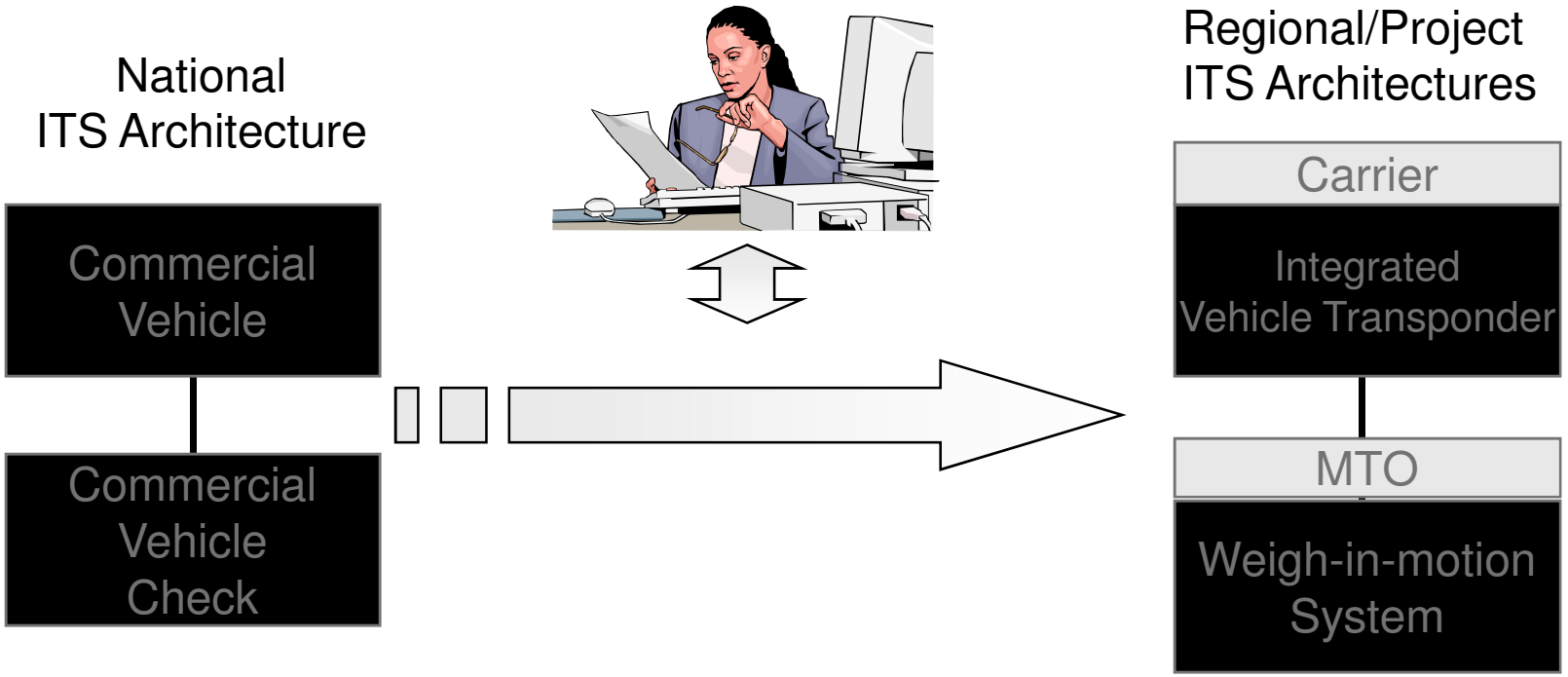
What is an ITS Architecture?

"A common framework for planning, defining, and integrating intelligent transportation systems."



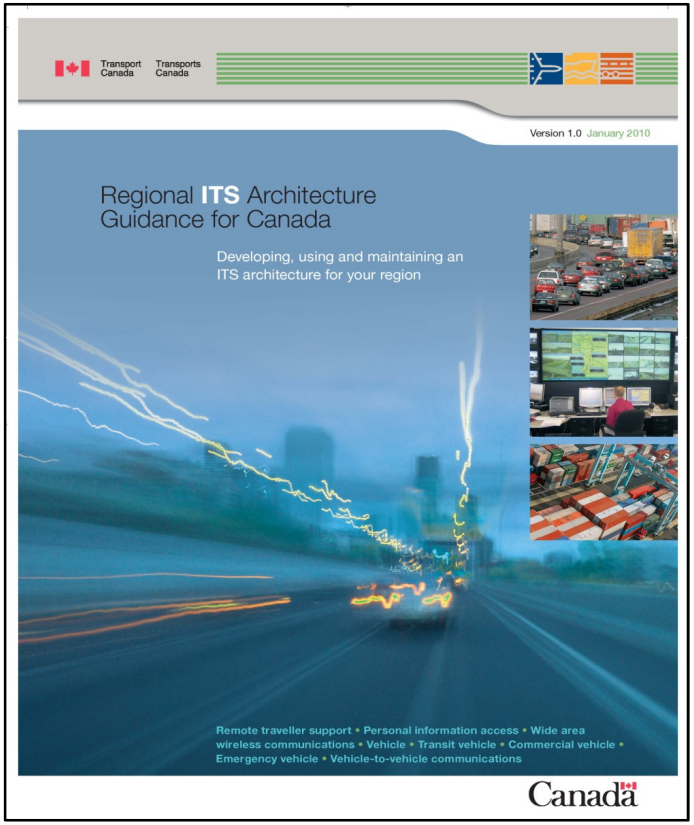
What is a Regional ITS Architecture?

"A regional framework for ensuring institutional agreement and technical integration for the implementation of ITS projects in a particular region."

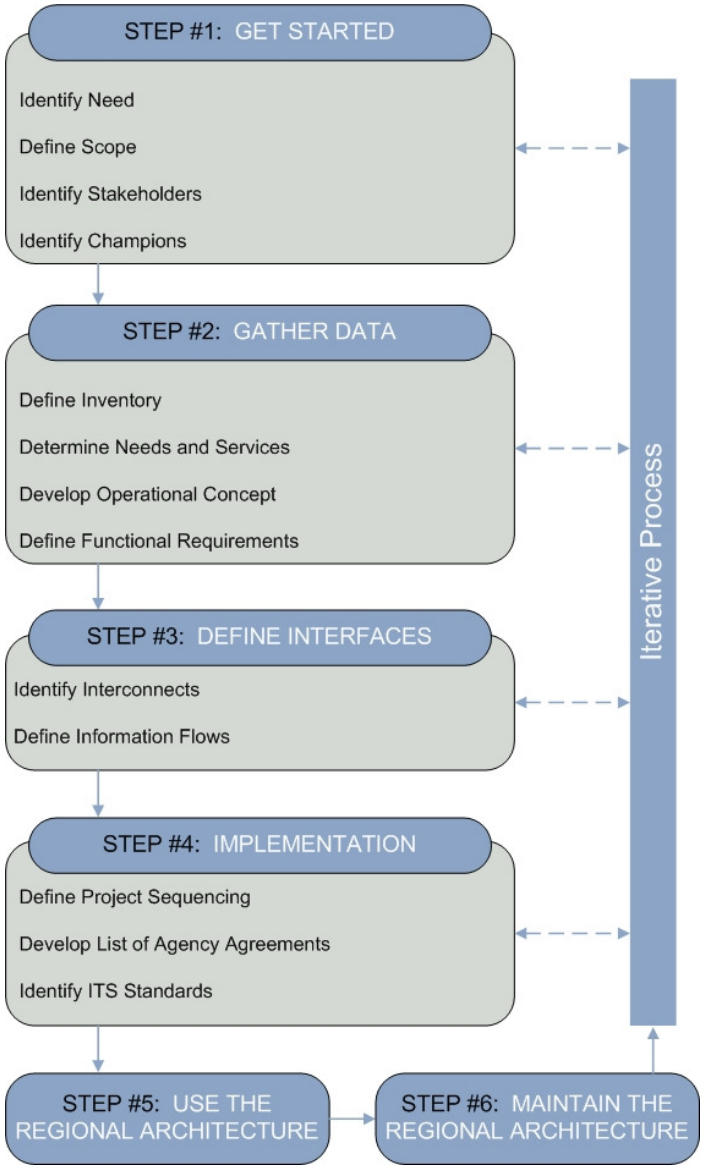


- ITS Architecture for Canada v2.0
  - *A powerful tool for planning the regional development and integration of transportation systems*

- **The architecture helps to define what the elements of the system do and the information that is exchanged between them**
- **Transport Canada has published a guidebook and software tool to assist stakeholders in developing Regional ITS Architectures.**
- **This methodology will be applied to in order to develop the Smart Corridor Concept of Operations**



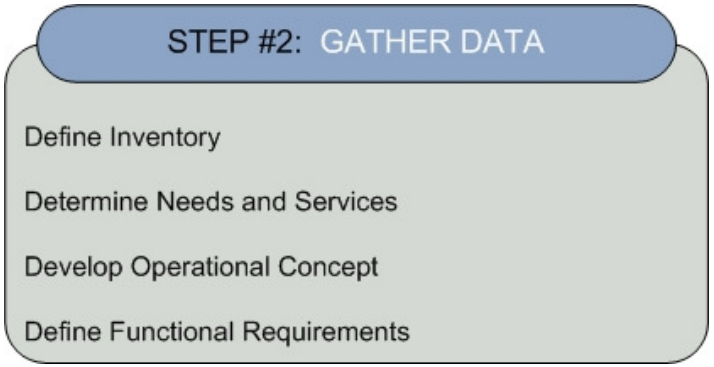
Process for Developing a Regional ITS Architecture



Step # 1: Get Started

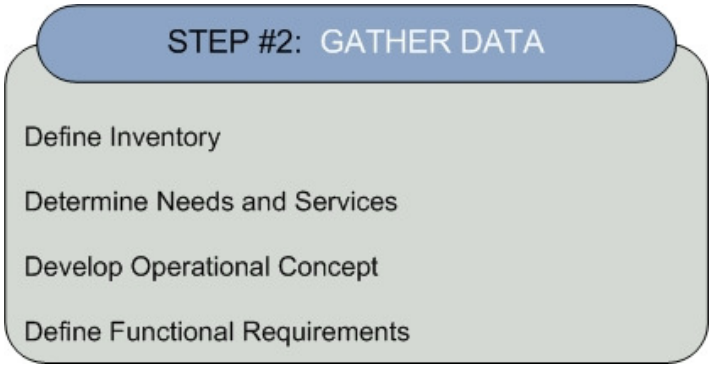
- Focus on the institutions and people involved.
- Define/identify:
  - Need
    - Decision is made to develop architecture
  - Scope
    - Geographic, functional, timeframe
  - Stakeholders
    - Owners, operators and maintainers of ITS
  - Champion(s)
    - Who drives the development, use and maintenance?

Step # 2: Gather Data



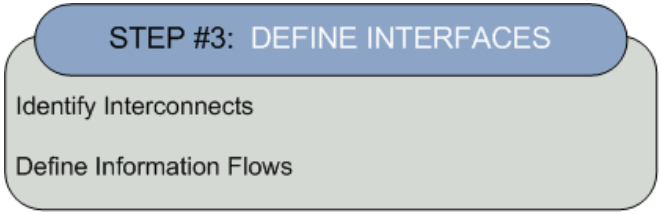
- Focus on assembling the building blocks
- Compile:
  - Inventory
    - existing, planned and proposed systems/devices
  - Needs and services
    - existing and planned projects
    - what needs are they addressing?

Step # 2: Gather Data (Cont'd)



- Compile:
  - Operational Concept
    - roles and responsibilities of the region's stakeholders
    - associated to services
  - Functional Requirements
    - high-level requirements of inventory elements
    - support services
    - draws from National architecture material

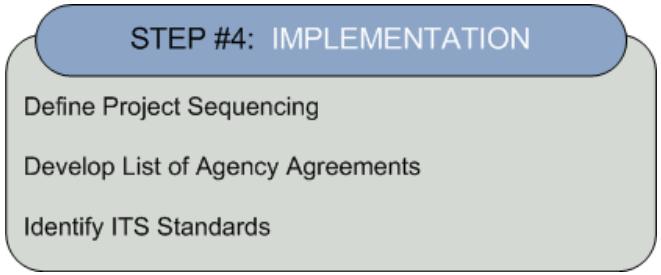
Step # 3: Define Interfaces



- Focus on putting together the building blocks
  - Identify which elements are integrated, and how, to support the selected services
- Interfaces:
  - Interconnects
    - which elements are connected
  - Information Flows
    - what data/information is shared
    - expand on National architecture as necessary

Step #4: Implementation

- Focus is on using the architecture to define additional products
  - Project Sequencing
    - Considerations: readiness, feasibility, dependency, coordination needs, costs/budget
  - Agency Agreements
    - Where data/information shared
  - Standards
    - Considerations: legacy systems, maturity of standards, availability



- A Concept of Operations
  - *System solutions required to achieve the Smart Corridor*

1. **Common vision of coordinated operations and information flows;**
2. **Stakeholder goals and objectives;**
3. **Stakeholder roles and responsibilities;**
4. **Current and future supporting system applications.**

VISION FOR THE CONCEPT OF OPERATIONS

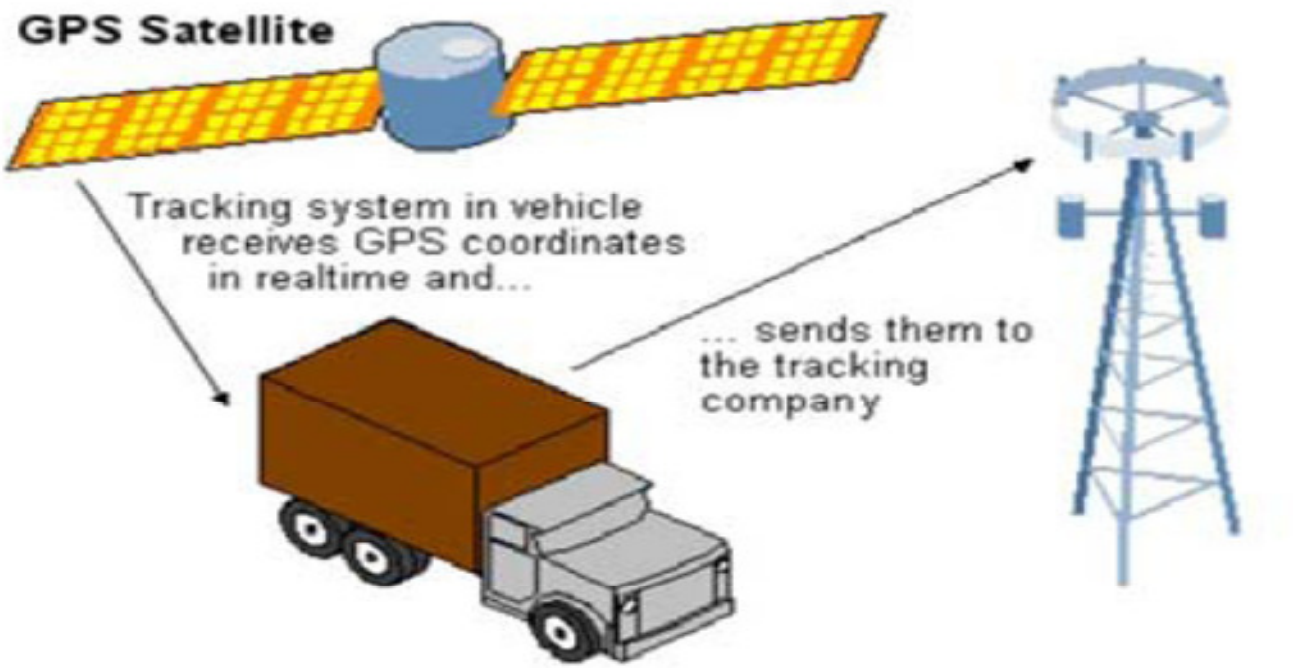
Elements of a Vision of a Smart Corridor

- Freight Tracking Technologies
- Border Crossing Technologies
- Commercial Vehicle Enforcement and Parking System Technologies
- “Connected Vehicle” and “Smart Roadside” Technologies
- Freight Mobility Technologies
- Emerging “Green” Freight Technologies

Freight Tracking Technologies

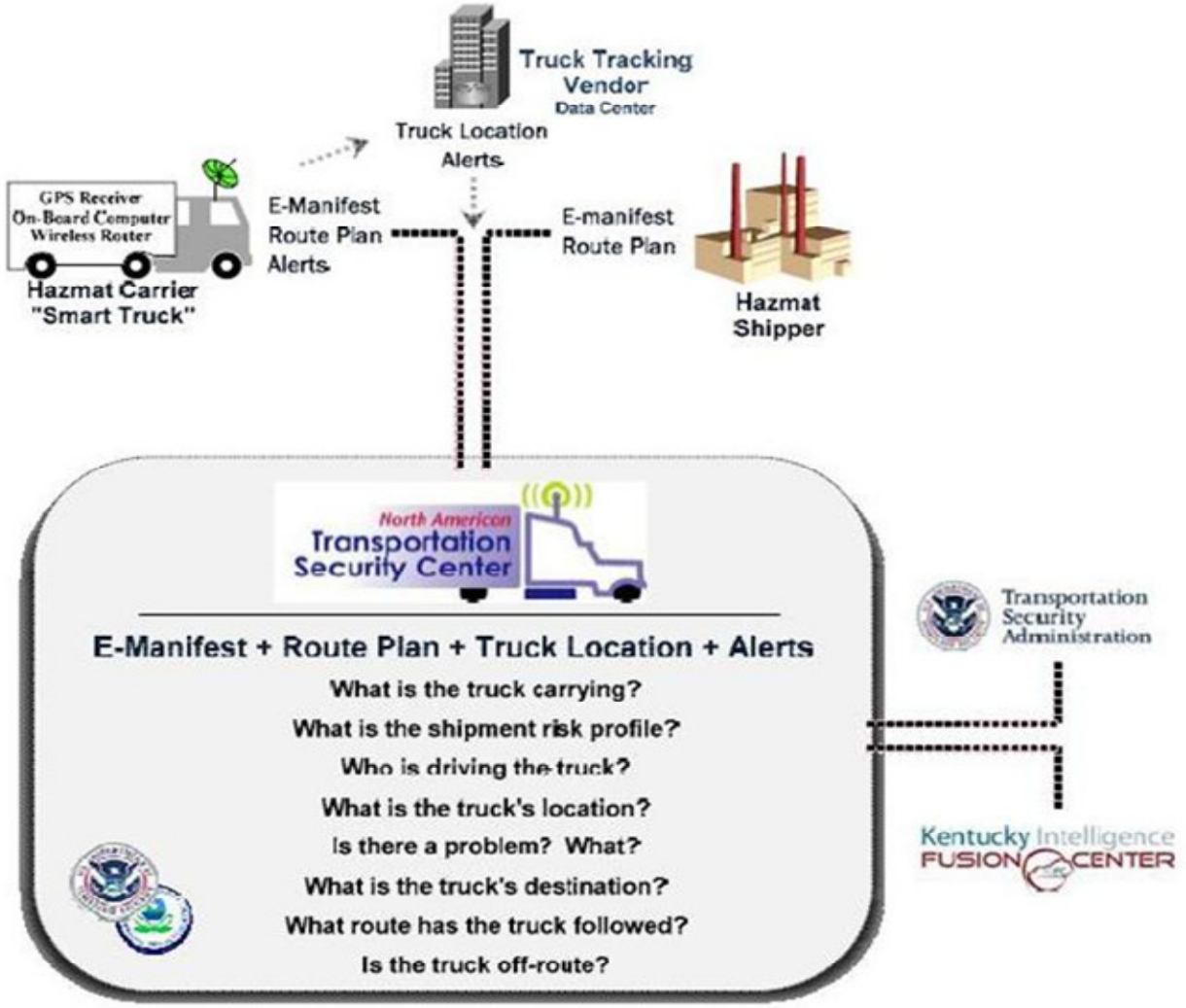
VISION FOR THE CONCEPT OF OPERATIONS

GPS Tracking of Trucks Across Corridors and Borders (Commercial Applications)



- Real-time GPS data could support real-time traffic operations, traveler information applications, freight logistics and security monitoring
- TC and USDOT have been successful in working with the private sector to obtain GPS archived data on truck movements

Dangerous Goods Transportation Security Management and Tracking



Pacific Northwest E-Seal Test

- Disposable Electronic Container Seal
  - Costs $5 to $20
  - Continuous broadcast RFID @ 315 MHz
  - Readable at 35 MPH
  - Transmits unique ID number
  - Tamper indicator message (not real-time)

- U.S. Dept. of Agriculture E-Seal Test
  - In-bond containers of prohibited foods
  - Track containers from Port of Tacoma to Canada
  - Reader at border indicates when containers have left country

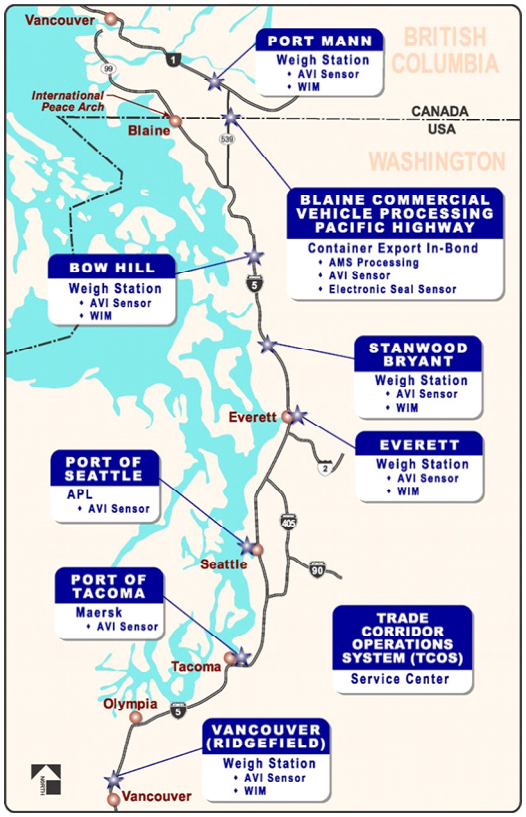
- Westwood Shipping E-Seal Test
  - Track in-bond containers of auto parts from Japan through Port of Seattle to Canada
  - Customs inspectors read seals at Port of Seattle
  - Another read at Border

Border Crossing Technologies

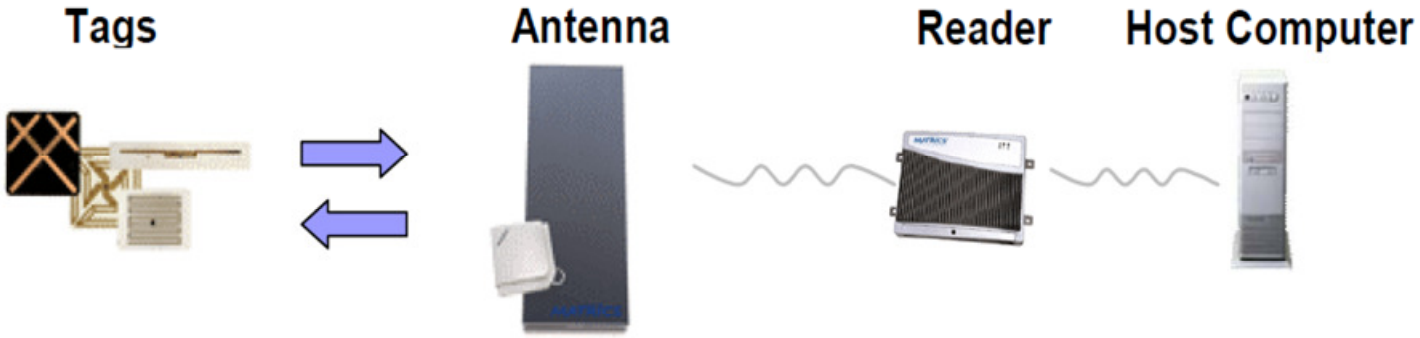
VISION FOR THE CONCEPT OF OPERATIONS

IMTC CVO Border Crossing Deployment

- Use of transponders (truck) and E-Seals (container) to track and verify shipments from SEA-TAC ports to Canada
- Integration with U.S. and Canadian CVISN transponder WIM network and U.S. Customs Automated Manifest System
- Provide travel time savings for motor carriers at border through expedited clearance for low-risk shipments on trucks
  - *ITS Dedicated Truck Lanes*
- Elimination of physical inspection benefits trucks & enforcement
  - *Bi-National Virtual Weigh Station*
- Reductions in U.S. Customs processing times benefits Customs and motor carriers

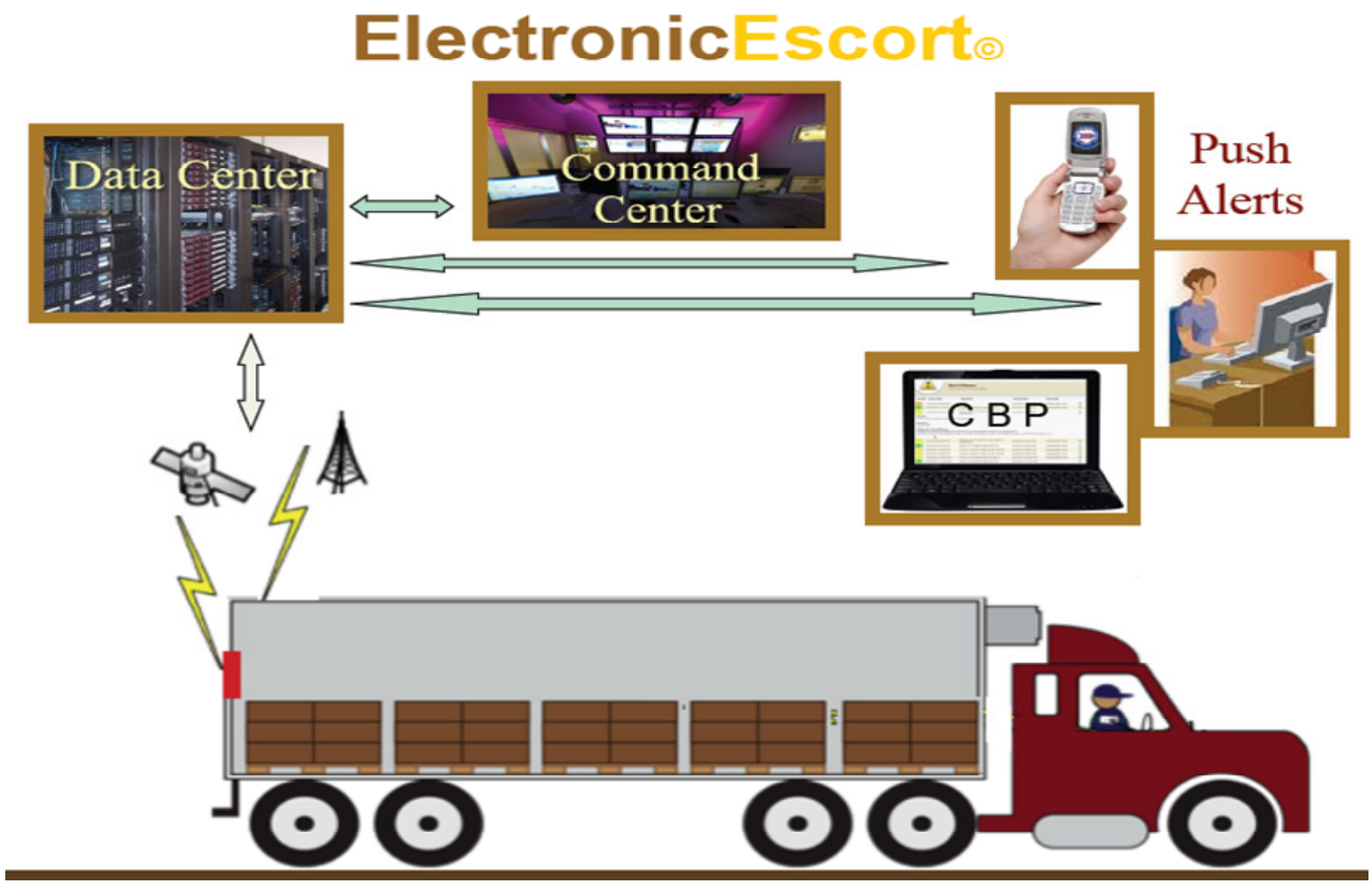


Use of RFID to Measure Border Weight Times



- Information typically desired by Stakeholders:
  - Current and predicted border crossing
  - Current and predicted travel time of segments entering POE
  - Current bridge closure information
  - Location of recent roadway incidents
  - Incoming and outgoing HAZMAT
  - Predicted travel time between predefined O D within the region
  - Current and predicted conditions of highway segments

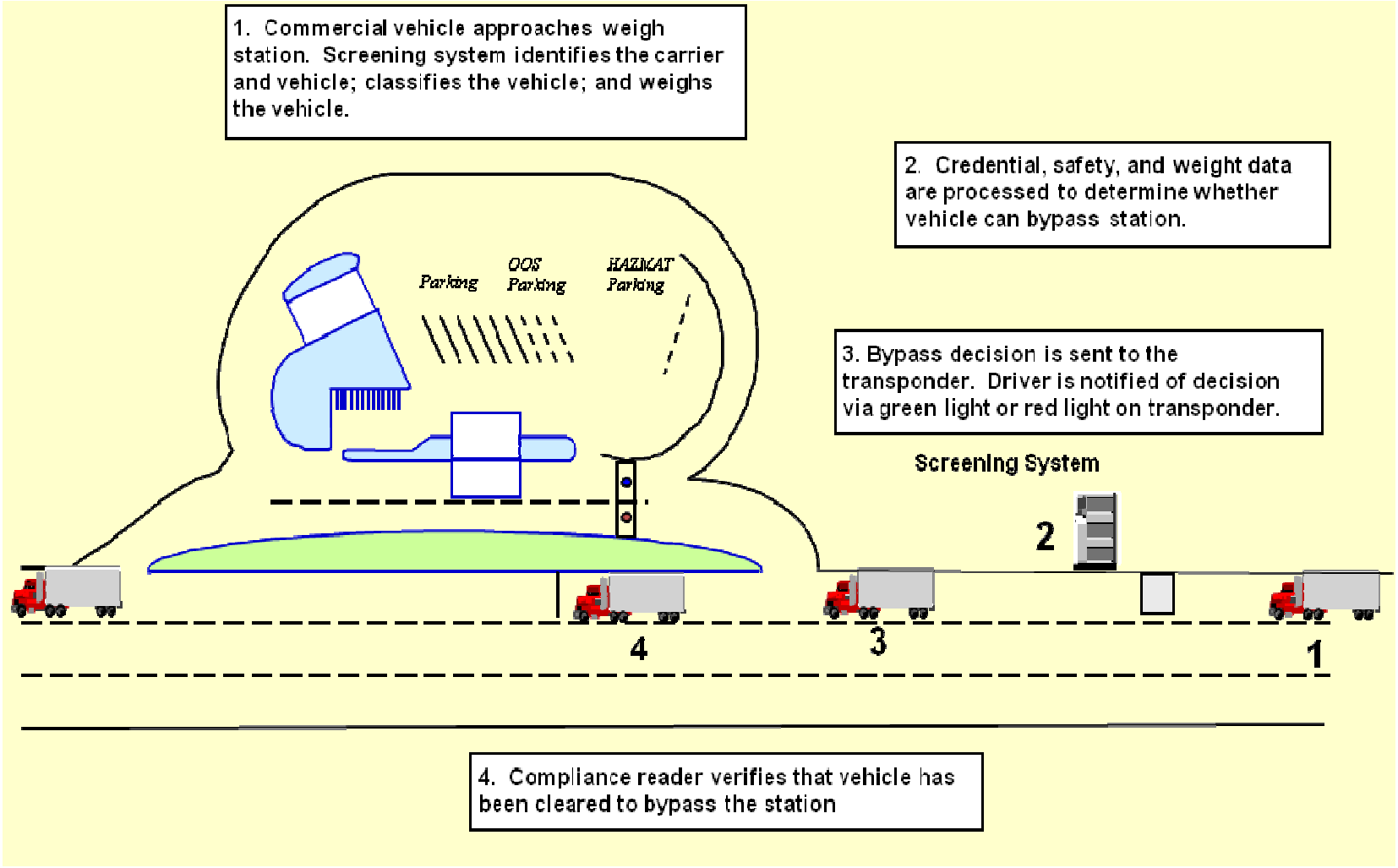
FHWA/DHS/Private Sector "Secure Border Trade" and "CBP-21" Truck Security Border Crossing System Test



Commercial Vehicle Enforcement and Parking System Technologies

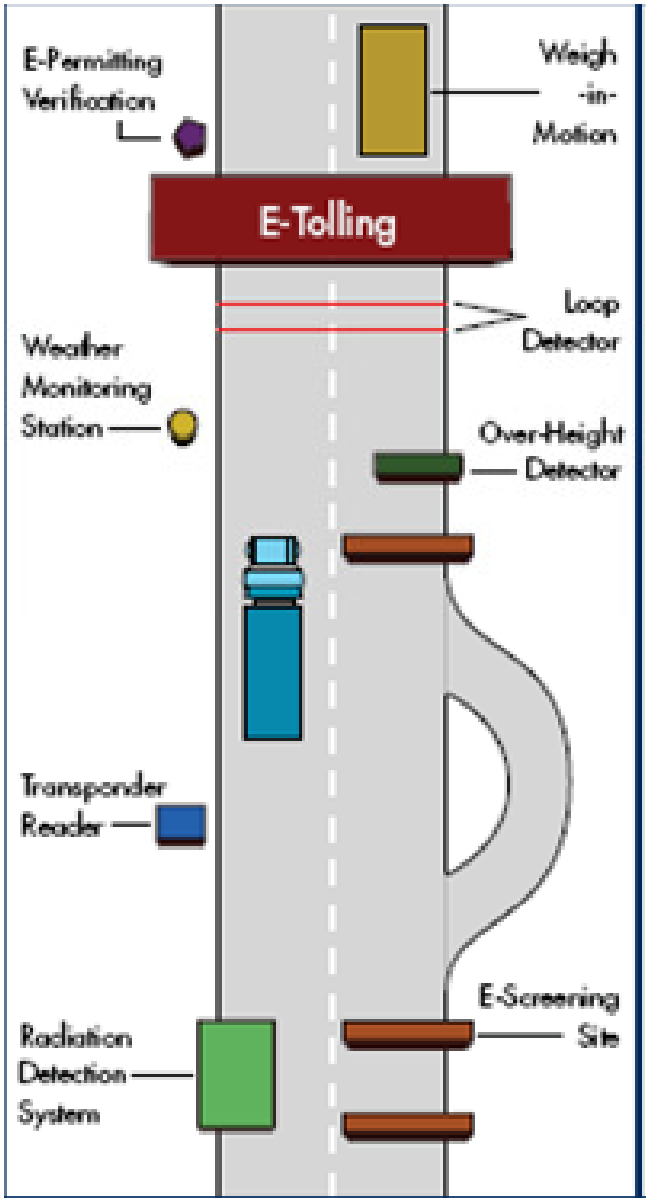
VISION FOR THE CONCEPT OF OPERATIONS

Truck Screening and Automated Weigh-In-Motion



"One Truck – One Transponder" Concept

- A single communication device to support all private- and public-sector roadside applications remains a primary goal of ITS/CVO



- Wireless commercial vehicle inspections
- Targeting of enforcement resources
- Delivery of real-time traveler/traffic information
- Queuing of CMVs at ports/intermodal facilities
- Asset tracking
- Toll collection
- Vehicle-to-Vehicle (V2V) communication
- Planning

Truck Parking

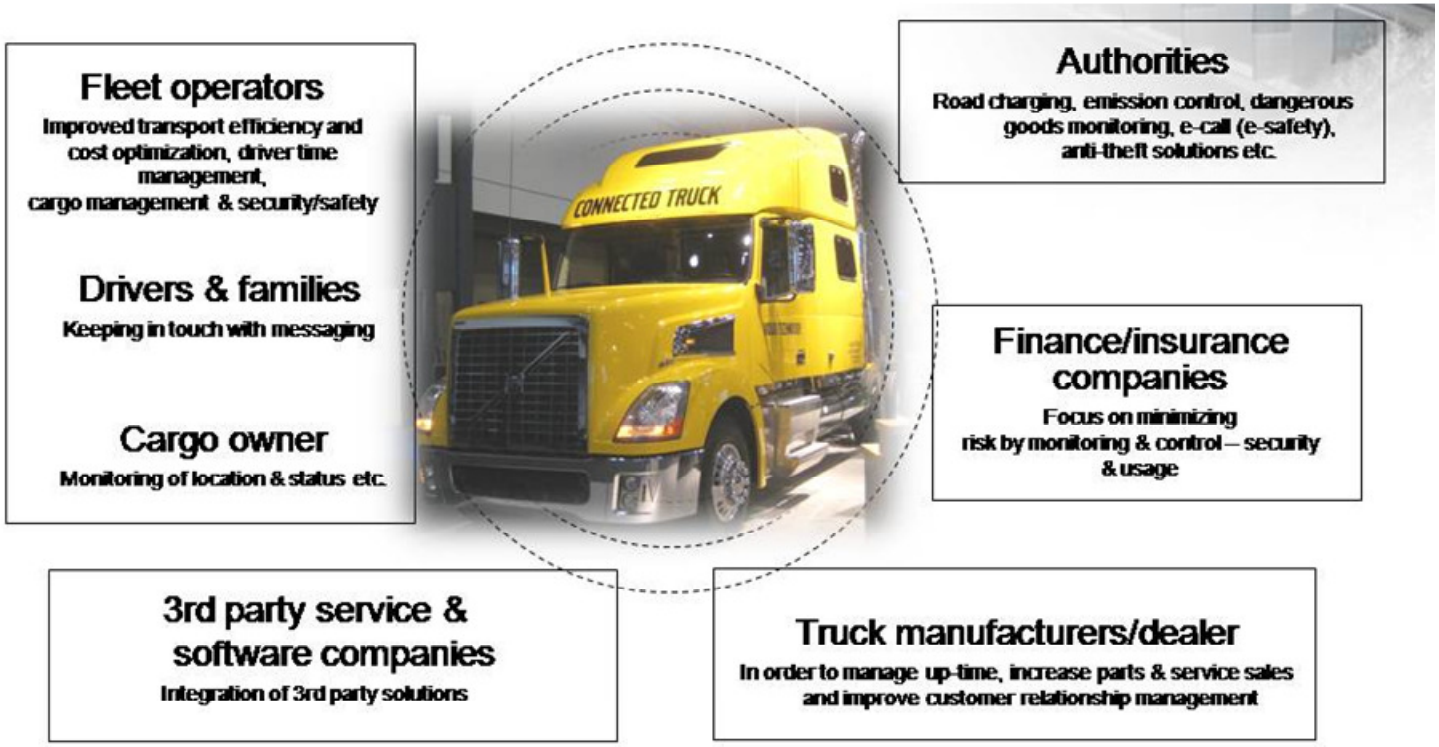
- Driver fatigue and the availability of safe and legal parking is a primary concern for many jurisdictions
- Numerous initiatives in the US are investigating how to maximize available capacity and/or add additional capacity
  - FMCSA SmartPark
  - I-95 Corridor Coalition Truck Parking Initiative
  - PENNDOT Truck Parking Public-Private Partnership

Connected Vehicle

VISION FOR THE CONCEPT OF OPERATIONS

The Future of Smart Roadside Communications

- The Connected Truck

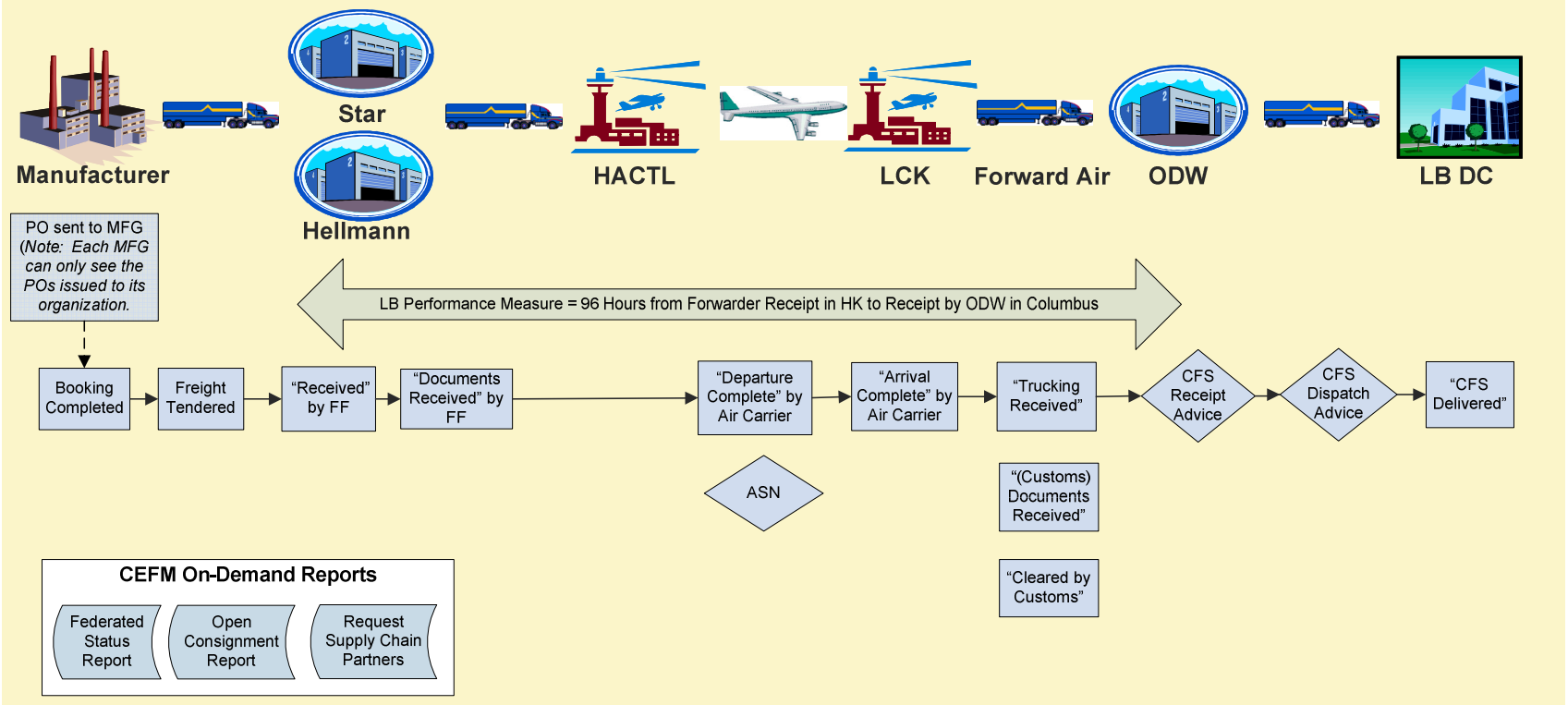


- Commercial Vehicle Infrastructure Integration (CVII)
  - Vehicle to roadside communications

Freight Mobility Technologies

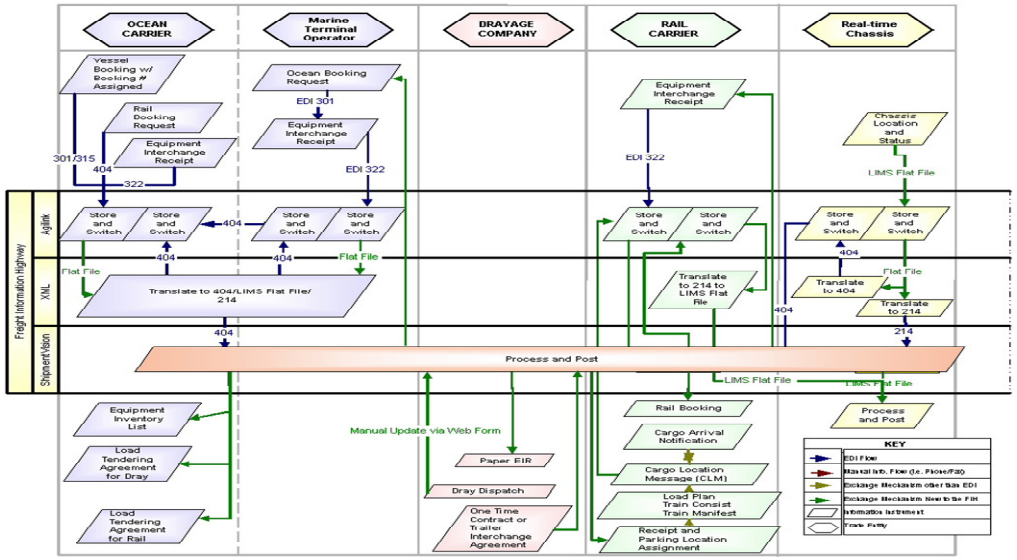
VISION FOR THE CONCEPT OF OPERATIONS

Electronic Freight Management (EFM)
Supply Chain Logistics Efficiency Improvement Program



- Initial tests were in Columbus and Kansas City
- Web services adoption package available for public download
  - http://projects.battelle.org/fih/Documents.htm
- Next phase in program is "Business Case" adoptions

Electronic Freight Management Program (USDOT): Freight Information Highway

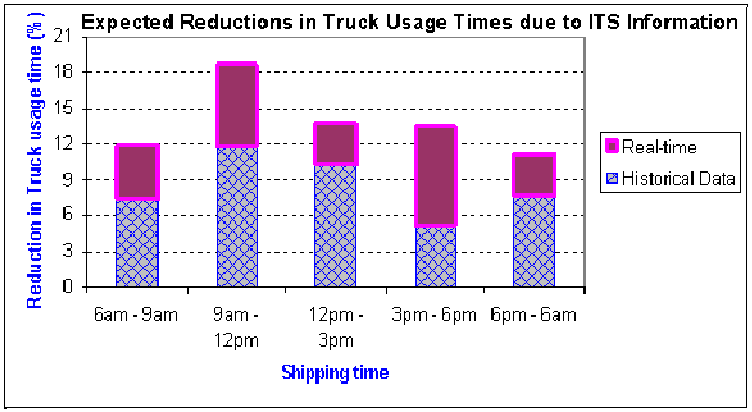


- Freight Information Highway
  - Ability to capture and standardize intermodal freight shipping and tracking data from multiple sources and in multiple formats
  - Developed open-source XML “schema”, which can be used by the private and public sectors to share intermodal freight data

- Freight Information Highway (13,559,712 shipments/year):
  - FIH benefits of $11.61 per shipment - $160million/year

New Programs: (C-TIP)

- Currently being deployed in Kansas City
- Future deployment by Transport Canada being investigated



C-TIP Has Five Core Elements (expanded on next page):

- Intermodal Move Exchange (IMEX)
- Wireless Drayage Updating (WDU)
- Chassis Utilization Tracking (CUT)
- Real-Time Traffic Monitoring (RTTM)
- Interchange Capacity Mgmt. (ICM)

Cross-Town Improvement Program (C-TIP) Applications Description

- Intermodal Move Exchange (IMEX)
  - An open architecture port that allows for a collaborative dispatch management model among rail lines, truckers and facility operators
- Wireless Drayage Updating (WDU)
  - An open architecture mechanism utilizing low cost wireless technology as an interface between drivers and dispatchers
- Chassis Utilization Tracking (CUT)
  - An open architecture application that allows for accurate chassis identification and status reporting, and allocation of usage costs
- Real-Time Traffic Monitoring (RTTM)
  - Real-time monitoring and distribution of route-specific and location-specific travel time and congestion information
- Interchange Capacity Management (ICM)
  - A combination of a simulation tool and a terminal management system that utilizes schedules to better manage container storage and retrieval

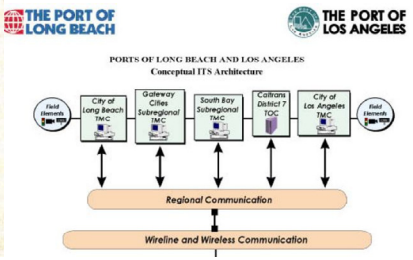
European Commission Smart Container Management (Smart-CM)

- Enable interoperable Border-2-Border co-operation
- Define & implement added value services / chain visibility enabling techniques
- Develop prototypes of advanced applications in global container management
- Contribute to standards development for advancing of interoperability of technologies
  - safe container chain management at global level
  - messages exchange
  - process implementation between customs and actors and among actors of the global container transport industry.

Emerging “Green Freight” Technologies

VISION FOR THE CONCEPT OF OPERATIONS

The Next 10 Years - Expected Benefits of Green Technology Solutions



Many motor carriers using 1990's and older trucks with high emissions

- ✓ Old trucks can retrofitted with "kits" to drastically reduce emissions
- ✓ Diesel Hybrid Tractors with near-zero emissions and 2x mileage
- ➢ Benefits: Improved Air Quality, Improved Energy Usage, Job Creation

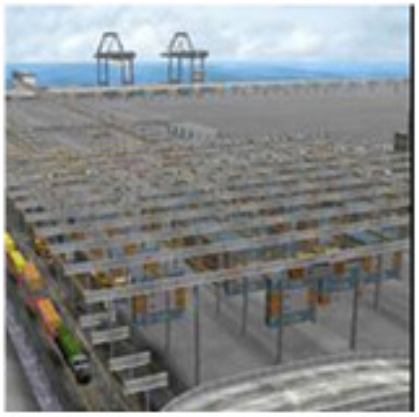
Truck congestion at terminals; inefficient container pickup and delivery

- ✓ Use of inexpensive sensors to monitor and optimize freight handoffs between freight terminals, rail terminals, motor carriers and on rail corridors
- ➢ Benefits: Reduced Congestion, Improved Air Quality, Improved Economic Competitiveness

Existing freeway and arterial performance problems and inefficiencies

- ✓ Regional-level Advanced Transportation Management and Information System
- ➢ Benefits: Reduced Congestion, Improved Air Quality, Improved Freeway Utilization

The Longer Term - Potential Benefits of Green Technology Solutions



Where additional physical expansion of freight terminals is no longer possible

- ✓ Robotic automation of container yards allow for increase in operations capability
- ➢ Benefits: Improved Air Quality, Improved Energy Usage, Improved Economic Competitiveness

Where levels of future trade overwhelm existing freeways and connectors near terminal

- ✓ Regional container transfer system using guideways or other technology to cover dray movements between intermodal facilities.
- ➢ Benefits: Reduced Congestion, Improved Air Quality, Improved Energy Usage, Job Creation

Where regional congestion results in gridlock conditions for goods movement

- ✓ Magnetic levitation container movement system developed to connect to inland ports
- ➢ Benefits: Reduced Congestion, Improved Air Quality, Improved Energy Usage, Job Creation

BREAK

SWOT Analysis

Strengths

Weaknesses

Opportunities

Threats

Strengths and Weaknesses

- **Strengths:** Alignment with strengths with the Corridor

- **Weaknesses:** Issues such as institutional barriers, limited automation, and poor alignment with technology trends

Opportunities and Threats

- **Opportunities:** Statements identifying the potential business case and applications from ITS strategies. Also includes specific projects and activities envisaged

- **Threats:** Technological risk, changing government policy, contrary market forces and loss of funding represent examples.

Breakout Session

- **Strength and Weaknesses** of current Corridor Operations

- **Opportunities and Threats** of achieving a Smart Corridor

Analysis Breakout

SWOT ANALYSIS

Plenary Session

SWOT ANALYSIS

- Identify relevant systems and devices
  - Existing – currently deployed and operational
  - Planned – identified and under current capital plans
  - Proposed – necessary, but not currently planned
- Identify related need
  - What is required to make Corridor Smart?
- Who is involved
  - Who owns/operates the equipment?
  - Who interacts with the equipment?

Analysis Breakout

SYSTEMS AND SOLUTIONS

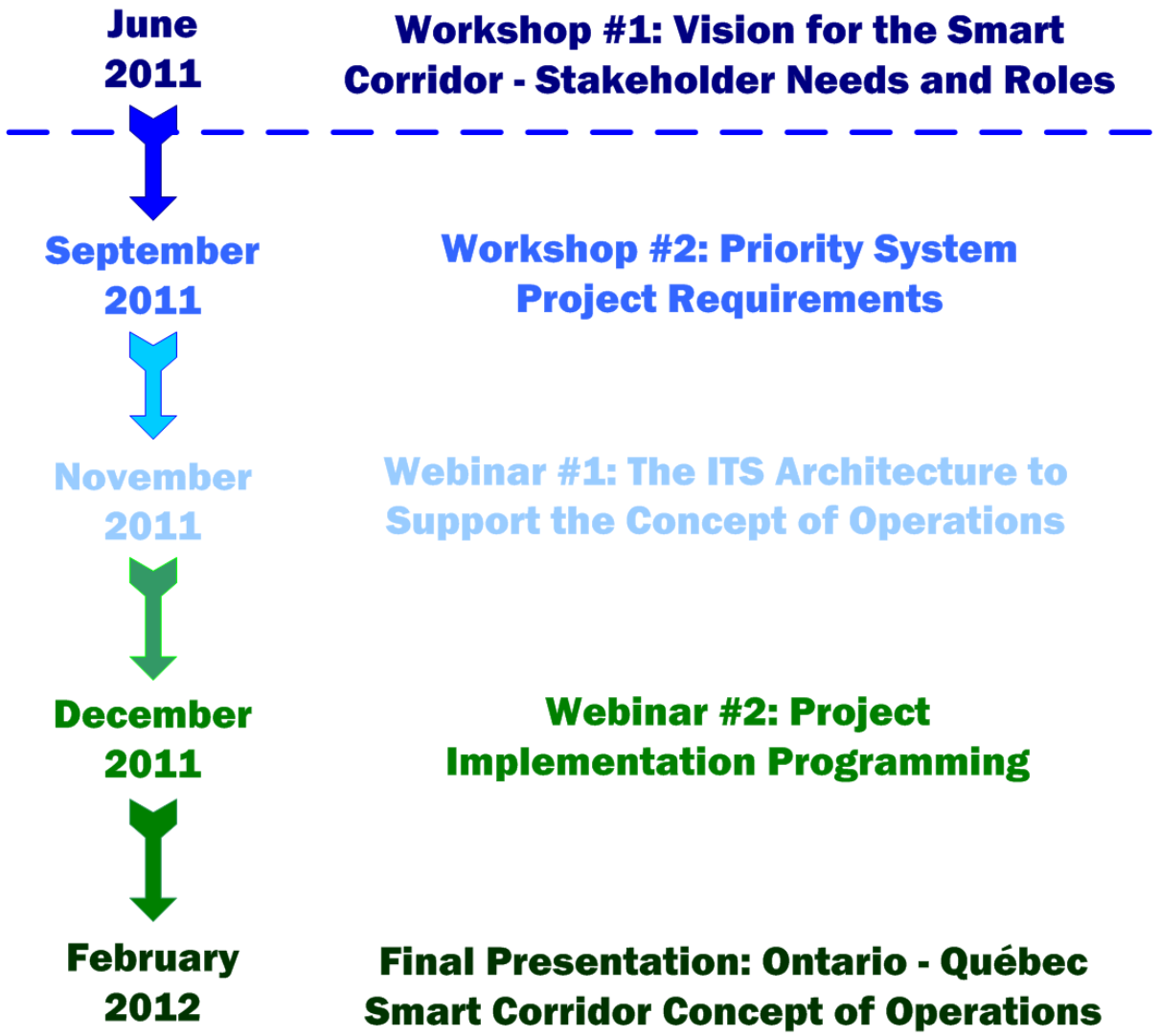
Plenary Session

SYSTEMS AND SOLUTIONS

NEXT STEPS

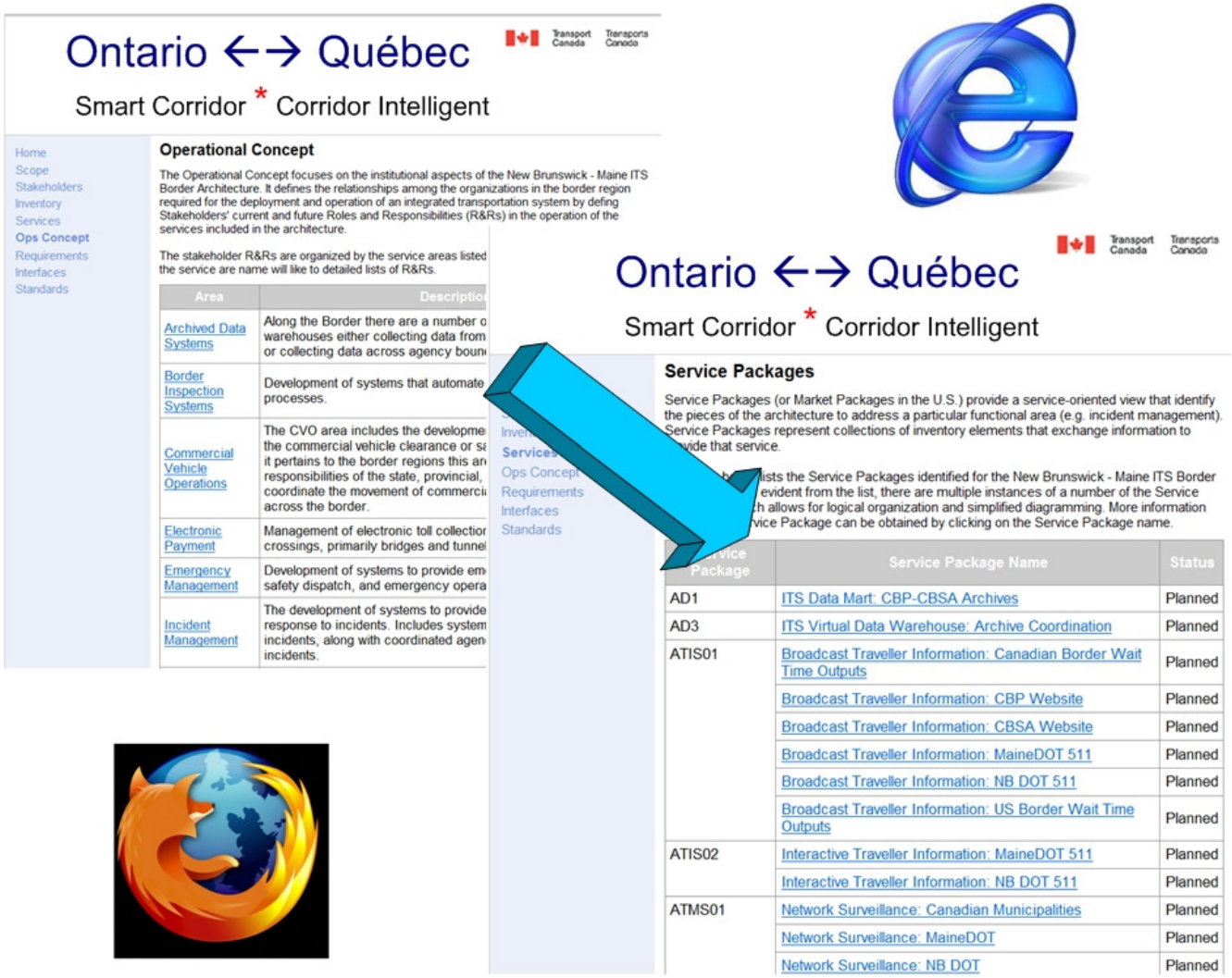
Next Steps

- Upcoming consultations and Final Presentation



Next Steps

- Stakeholder review of Draft Project Website



Next Steps

- Develop Final Report

- Recommend where Inter-organization Agreements apply