Advanced Traveller Information and Traffic Management Systems for Highway 2

Stakeholder Workshop
October 9, 2003
Outline of Workshop

- Introductory Remarks
  - Allan Lo, Alberta Transportation

- Summary of Needs
  - Alf Guebert, Earth Tech, Canada

- Overview of ITS Blueprint
  - Tim Schnarr, Delcan Corporation
  - Mark Pinet, M. Pinet & Associates

- Benefit / Cost Analysis
  - Tim Schnarr, Delcan Corporation

- What’s Next?
  - Allan Lo, Alberta Transportation
Introductory Remarks

Allan Lo

Alberta Transportation
Project Objectives

- Enhance safety and operations.
- Integrate solutions with adjacent municipal ITS plans.
- Deploy in a cost-effective and well-planned manner.
Study Area – Highway 2
Study Area – National Highway System
Project Scope

• Develop a “Blueprint” for future ITS deployment in the Highway 2 corridor
  – Traveller Information
  – Traffic Management
  – Incident Management

• Province-wide Road Weather Information System (RWIS) program

• Deliverables
  – ITS Strategic Plan
  – Functional Plans
  – Technical requirements/specifications
Purpose of Today’s Workshop

• **Overview of Needs**
  – Based on Stakeholder Input

• **Review ITS Blueprint**
  – Recommendations
  – Priorities
  – Benefits & Costs

• **Stakeholder Input**
  – Suggestions
  – Involvement/Partnerships
Format for Today

- Informal
- Discussion and comment from the group
- Time to fill-out workbook at the end of the session

Please be candid
Summary of Needs

Alf Guebert

Earth Tech Canada
Stakeholder Interviews

- One to one interviews at project outset
- Discussion of needs
- Approximately 50 interviews with 45 agencies
- Other informal discussions
- Stakeholders contacted exceeds 90 individuals
Common Themes

- Road Condition & Traffic Information
- Incident Management
- Road Weather Information Systems
- Traffic Control & Management
- Work Zone Safety
- Commercial Vehicle Operations
- Inter-Agency Coordination
- Data Collection/Management
Road Condition & Traffic Information

- More accurate and timely information
- Wider dissemination and easier access to information
- Improve sharing of information and data
Incident Management

- Timely detection & verification (location)
- Coordination, control and monitoring of lane closures
- Highway closure capabilities
- Protection of site & personnel
- Hazardous materials
Road Weather Information Systems

- Existing atmospheric and road conditions
- Ability to forecast atmospheric and pavement conditions
Traffic Control & Management

- Improve safety
- Maximize capacity of existing infrastructure
- Minimize impacts of recurrent congestion
- Minimize stops and reduce travel time in major corridors
Work Zone Safety

- Protection and safety of site personnel
- Improve traveller information
Commercial Vehicle Operations

- Minimize infrastructure damage due to over height and overweight loads
- Minimize delays at vehicle inspection stations
- Compatibility with other provinces and states
Inter-Agency Coordination

- Coordination, control and monitoring of lane closures
- Improve sharing of traveller information and data
Data Collection/Management

- Maximize use of existing equipment and systems
- Maximize access to information and data (electronic sharing)
- Develop partnerships
Summary of Stakeholder Needs

- Accurate and timely road, weather and traffic information
- Scheduled events, incidents, highway closures
- Wider dissemination and easier access to the information
- Minimize impacts of recurrent congestion
- Data management and sharing (agencies)
Overview of ITS Blueprint

Tim Schnarr
Delcan Corporation
What Is the ITS Blueprint?

- Blueprint for Future Action
- Identifies Potential ITS Actions / Deployments
- Identifies Priority Sections
Overview of ITS Blueprint

What Can We Do to Address the Needs?
Highway 2 Blueprint

Anthony Henday Drive

Rural Section

Deerfoot Trail
Preliminary Blueprint Outline

- Broken down into three identifiable highway sections:
  - Rural
  - Deerfoot Trail (Urban)
  - Anthony Henday Drive (Urban-Rural)

- Broken down by three timeframe periods:
  - Immediate (0-2 years)
  - Short (3-5 years)
  - Long (6-10 years)
Rural Section
Rural Section

CHARACTERISTICS

• Low Volume
  – LOS A/B
  – AADT’s 15,000 to 30,000 (50,000 in some sections)

• Safety (800 Collisions Annually)
  – 40% Single Vehicle Collisions
  – 25% Animal Hits
  – 25% Weather Related
Rural Section

NEEDS

• Motorist Advisory / Traveller Information
  – Highway Closure
  – Road and Weather

• Winter Maintenance
Rural Section – Existing Systems
Rural Section ITS Program

SHORT TERM (0 to 5 years)

- Traveller Information Database
- ATIS Dissemination
  - Website
  - DMS (Permanent & Portable)
  - Commercial Broadcast Radio
- RWIS (National Highway System)
- Incident Management (Red Deer)
- Animal Detection (Pilot Test)
Rural Section – Short Term

Red Deer

DMS

TRAFFIC SIGNAL COORDINATION (HWY 2A)

RWIS

CCTV/INCIDENT Mgmt.

CALGARY

EDMONTON

OVERHEIGHT VEHICLE DETECTOR

RAMP TERMINAL SIGNAL COORD

TRAFFIC SIGNAL COORDINATION (HWY 2A)

WILDLIFE DETECTION

OVERHEIGHT VEHICLE DETECTOR

DMS

DMS

DMS

RWIS

RWIS
Rural Section ITS Program

LONG TERM (6 to 10 years)

• **RWIS**
  – Automated Surface Condition Reporting
  – Maintenance Decision Support System
  – FAST (Red Deer River Bridge)

• **Commercial Vehicle**
  – Central Carrier Database
  – Electronic Sorter & Bypass System
  – Weigh-in-Motion
Deerfoot Trail
Deerfoot Trail

CHARACTERISTICS

• High Volumes
  – LOS D
  – AADT’s of 50,000 to 140,000

• Safety
  – 560 collisions annually
  – 70% congestion related (50% rear ends, 20% side swipe)
  – 30% weather related
Deerfoot Trail

NEEDS

• Congestion
  – Ramps
  – Mainline

• Incident Response

• Traveller Information
Deerfoot Trail ITS Program

SHORT TERM (0 TO 5 YEARS)

- Ramp Terminal Operations
- Incident Management
  - CCTV cameras
  - Collaborative TMC
- Traveller Information
  - Database
  - DMS (Permanent & Portable)
  - Website
  - Commercial Broadcast Radio
- Fixed Automated Spray Technology (FAST)
  - Calf Robe Bridge
Deerfoot Trail – Short Term

Proposed DMS

Potential Signal Improvement/Off-ramp queue management

Proposed DMS

Incident Mgmt. From Beddington trail to Hwy. 22x
Deerfoot Trail ITS Program

LONG TERM (6 to 10 years)

• Incident Management
  – Additional CCTV cameras & DMS
  – Implement Automated Incident Detection

• RWIS
  – Automated Surface Condition Reporting
  – Maintenance Decision Support System

• Ramp Metering
Proposed DMS

Potential Signal Improvement/Off-ramp queue management

Incident Mgmt. From Beddington trail to Hwy. 22x

Proposed DMS

Potential ramp metering

Proposed DMS

Proposed DMS

Proposed DMS

Proposed DMS

Potential ramp metering

Proposed DMS

Proposed DMS

Proposed DMS

Hwy 22X
Anthony Henday Drive (AHD)
Anthony Henday Drive

CHARACTERISTICS

• Moderate Volumes
  – LOS B/C
  – forecast AADT’s of 30,000 to 70,000

• Safety
  – 760 collisions forecast annually
Anthony Henday Drive

NEEDS

• Traveller Information
• Winter Maintenance
• Safety
Anthony Henday Drive
ITS Program

SHORT TERM (0 TO 5 YEARS)

• Integrate Traffic Signals with the City’s

• Traveller Information
  – ATIS Database
  – Website
  – DMS

• RWIS & FAST on River Crossing

• Incident Management
  – CCTV at Select Locations
  – Call-In Centre
Anthony Henday Drive
ITS Program

LONG TERM (6 to 10 years)

• Incident Management
  – 100% CCTV coverage
  – Automated Incident Detection
  – Add DMS

• RWIS
  – Automated Surface Condition Reporting
  – Maintenance Decision Support System
Early Winners

- ATIS Database
- DMS
- Incident Management
  - CCTV along Deerfoot Trail
  - Collaborative TMC
- RWIS
  - Stations
  - FAST
Overview of ITS Blueprint

Mark Pinet

M. Pinet & Associates Limited
• Atmospheric
  – Wind Speed/Dir.
  – Precipitation
  – RH/Temp
  – RPU
  – Tower
Alberta Transportation RWIS Network Design

RWIS Information

• Pavement
  – Passive Pavement Sensor
  – Surface Temperature
  – Surface Condition
  – Residual Deicing Chemical %
  – Predicted freeze point

• Ground
  – Sub Surface Temperature
Alberta Transportation RWIS

RWIS Advanced Components

- Precipitation identifier
- Cameras for Visibility
Active Pavement Sensors
Passive Pavement Sensor
- Surface Temperature
- Surface Condition
- Residual Deicing Chemical %
- Measured freeze point
- New Technology
Alberta Transportation-RWIS - Proposed Locations

- Result –
  - GIS Model Results
    Illustrating Highway Segments Represented By Each RWIS site
  - Representative of:
    - Meteorology
    - Topography
    - Traffic volumes
    - Nominal 50 km spacing
Rural Section RWIS Program

- **Phase One Scope**  
  - 30 Site

- **Timing**  
  - Compl. Oct /04

- **Basic Equipment**
Rural Section RWIS Program

- Phase Two Scope
- Timing
- Installed Oct/05
- Basic Equipment
- Advanced RWIS sensors Ph1,2,Cameras
Urban RWIS Program

• Calgary
• Deerfoot RWIS upgrades Ph 2 (proposed)
• Edmonton
RWIS   RWIS   Architecture
ATIS ATIMS

Legend
Collisions on Highways
1 - 10
11 - 20
21 - 30
31 - 40
41 - 50
National Highways
Sites in Typical Area
Sites in Problem Area
25 km Radius

ServiceContradors

Environment
Environment Server

Alberta
AGRICULTURE, FOOD AND RURAL DEVELOPMENT

VAM
FAST

- Future - Advanced RWIS Candidate Sites
- Calf Robe
- AHD
- Red Deer River Bridge
Benefit / Cost Analysis

Tim Schnarr

Delcan Corporation
Capital Costs

• Approximately $21 Million over 5 years

• Distribution
  – 40% Deerfoot Trail
  – 30% RWIS
  – 15% Anthony Henday Drive
  – 15% Rural
Operating & Maintenance Costs

- Estimated $1 Million to $2.5 Million Annual
- Combined Capital & Operating of approx. $5 Million Annually
Potential Benefits

- **Quantified**
  - Reduction in Vehicle Delays
  - Reduction in Number of Collisions
  - Reflects Impact of Incident Management, RWIS, etc.

- **Qualitative**
  - Driver Frustration
  - Customer Satisfaction
  - Environmental
  - Reflects Impact of ATIS, RWIS, etc.
Projected Benefit/Cost Ratios

- **ATMS/ATIS**
  - Deerfoot Trail: 7:1
  - Rural Section: 3:1
  - Anthony Henday Drive: 2:1

- **Road Weather Information**
  - Rural Section: 6:1

- **FAST**
  - Deerfoot Trail: 3:1
  - Anthony Henday Drive: 3:1
Where Do We End Up?

- **Road & Traffic Condition Information**
  - Real-Time
  - DMS & Web-Based (Media)

- **Road Weather Information**
  - Improved surface conditions
  - Efficiency/management of maintenance operations

- **Incident Management**
  - Deerfoot Trail
  - Anthony Henday Drive
  - Rural

- **Technology Integration & Teamwork**
Challenges

- **Legacy Systems**
- **Inter-agency Coordination**
  - Data Collection
  - Data Sharing
- **Traffic Management Centres**
  - Regional
  - Partnerships
What’s Next?

Allan Lo

Alberta Transportation
Current Activities

- **Dynamic Message Signs**
  - Two new DMS in Red Deer area
    - Highway Closures
  - Two replacement DMS (Balzac/Leduc)
    - Reliability & Compatibility
  - Completion Spring 2004
Current Activities

- RWIS
  - 70 sites on National Highway System
  - Staged over 2 years
  - Completion 2006
    - Transport Canada funding dependent
What’s Next?

- ATIS Database
- Incident Detection & Management Deerfoot Trail
- DMS deployment - other highways
The End?
Advanced Traveller Information and Traffic Management Systems for Highway 2

Completion of Workbooks