Keeping Travellers Mobile from the Prairies to the Rockies:

Challenges and Strategies in Deploying Alberta's Road Weather Information System (RWIS)

Jeremy Duensing
Transportation Product Manager
Schneider Electric

Shawn Truelson
Transportation Industry Manager
Schneider Electric

Nathaniel Papay, P.Eng., PMP
EPCOR Technologies

ACGM 2014, ITS-STI Canada
ITS Emerging Technologies – 1
June 4, 2014

EPCOR TECHNOLOGIES

Schneider Electric

AT RWIS Project

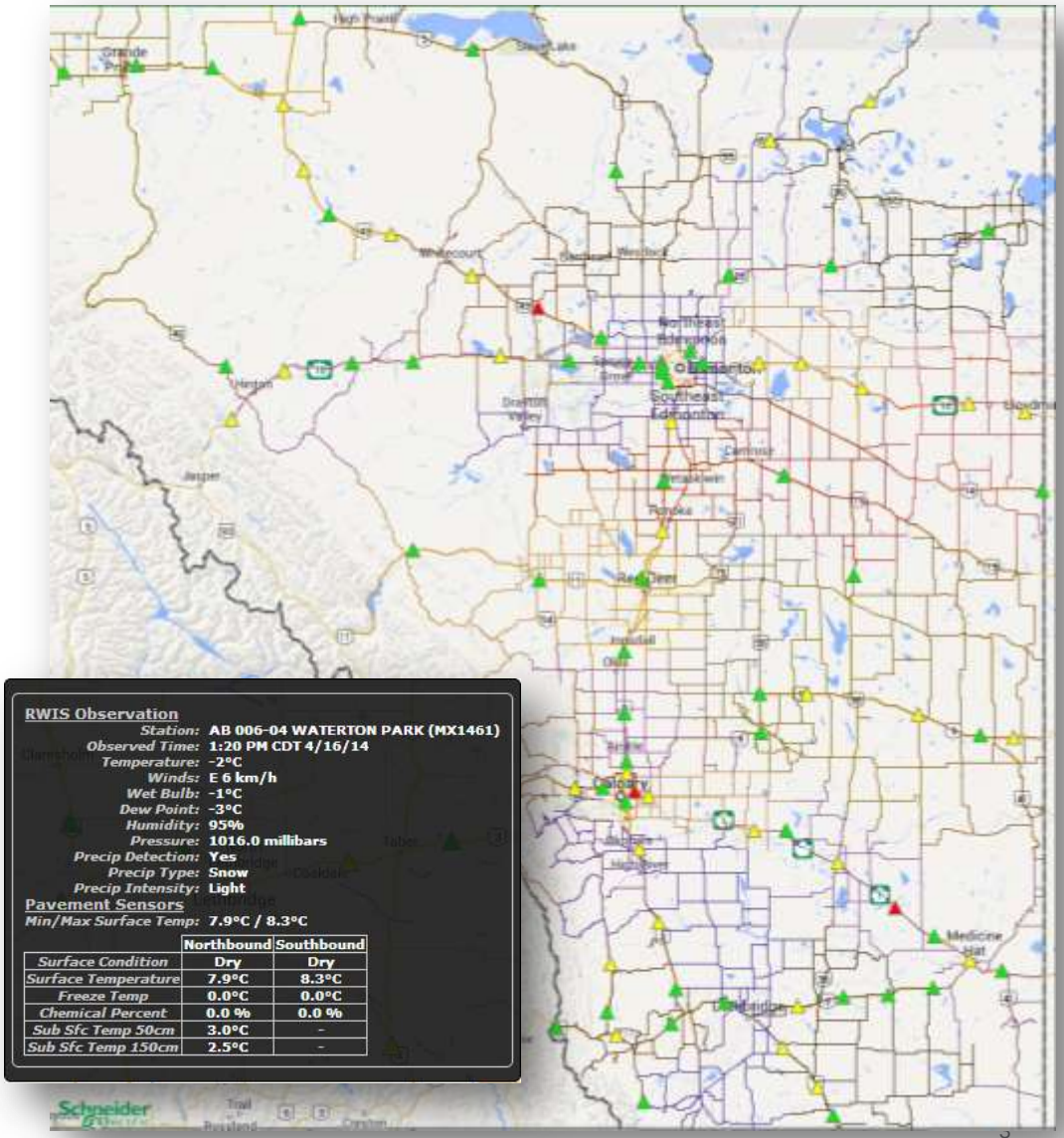
Description

- Since 2004, Alberta Transportation has worked with Schneider Electric to implement a provincial Road Weather Information System (RWIS) to enhance the economy and lifestyle of Albertans through improved decision-making and mobility.
  - RWIS collect information about the atmosphere and pavement.
  - Current weather and pavement conditions as well as forecasts are produced.
  - Highway Maintenance Contractors utilize this data to determine how best to treat the roadways.
  - RWIS observations and camera images are made available to motorists through 511Alberta.

AT RWIS Project

Project Evolution

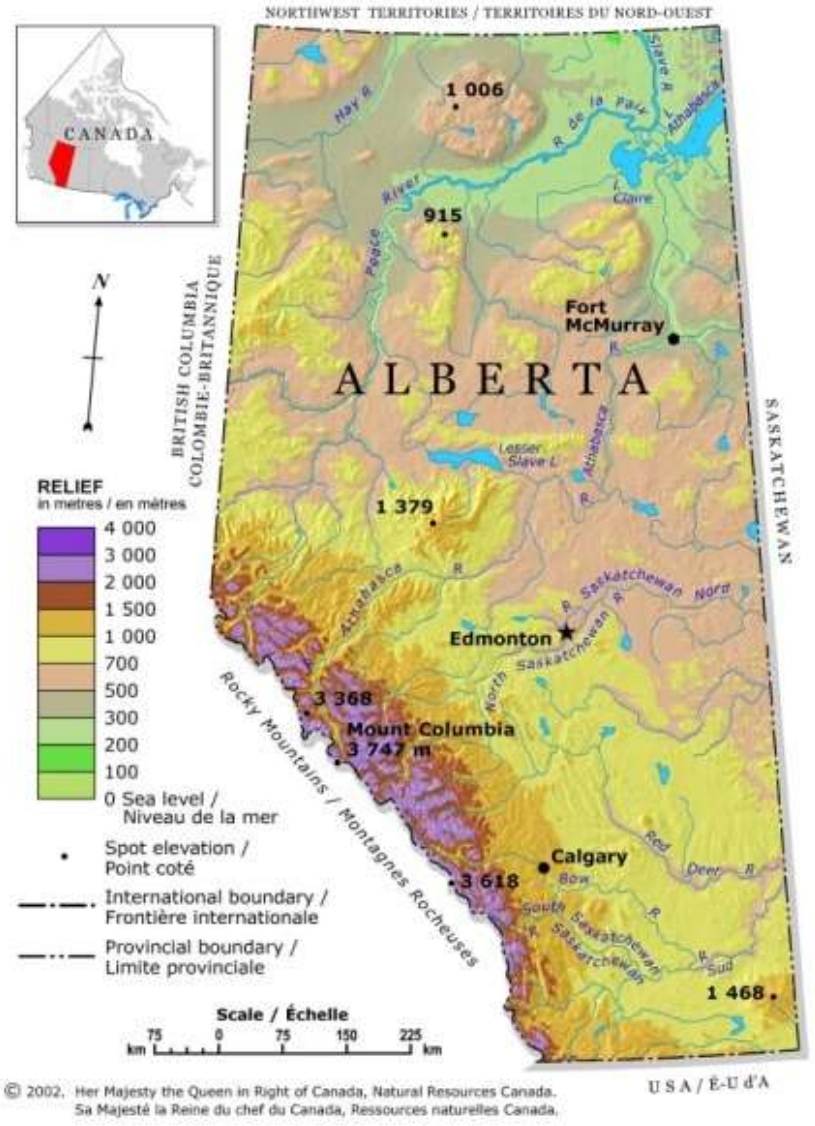
- 10 year project
- Four phases of implementation
  - Original Installation = 75 RWIS
  - Stoney Trail Expansion = 5 RWIS
  - System Expansion = 38 RWIS
  - Maintenance Decision Support System (MDSS) addition
- Ongoing operations and maintenance under a performance-based contract model
- Network continues to expand, evolve and adapt to continuous change and improvements
  - Cloud hosting
  - Integration of RWIS with other ITS systems
  - Changes in service model
  - New technologies
  - Organizational changes within both AT and Schneider Electric



AT RWIS Project

Challenges

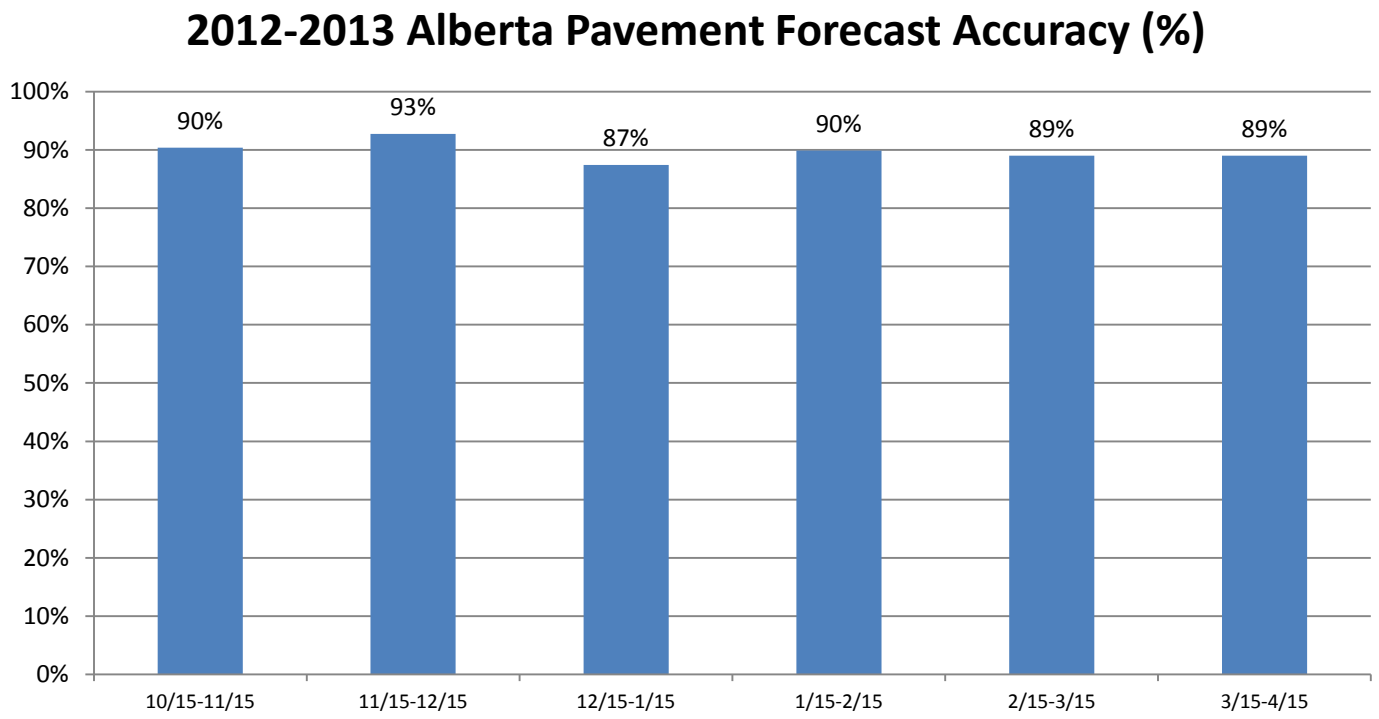
- GEOGRAPHY
  - Highly diverse geographical/meteorological landscape
  - 662,000 square kilometres
  - Extreme weather conditions, especially winds
  - Communications availability
- CONSTRUCTION
  - Coordination with ring road /bridge contractors
  - Factory Acceptance Testing (FAT)
  - Tech crew and ground crew coordination
- OPERATION & MAINTENANCE
  - Challenging weather conditions
  - Distance between RWIS
  - Cell reliability
  - Design challenges (UPS, miniport, RPU)
  - Aging infrastructure



AT RWIS Project

Performance Based Contract

- Contract sets minimum levels of performance with penalties for
  - Data Delivery Rate
  - Pavement Forecast Accuracy
  - Average Downtime to Repair
  - Service Level Agreement (SLA) for Repair and Mitigation



AT RWIS Project

Best Practice Deployment Strategies

- PROJECT ORGANIZATION
  - Use a subcontractor with proven ITS field experience!
  - Determine balance of responsibilities between Prime Contractor and respective subcontractors
    - Field engineering & survey work
    - Construction management & onsite logistics coordination
    - Procurement responsibility & logistics
    - Station design
    - Central server and network design
  - Coordinate diverse stakeholder base
    - Approvals from multiple utilities & agencies across various geographic jurisdictions
    - Be able to present and discuss design and construction considerations simultaneously

AT RWIS Project

Best Practice Deployment Strategies

- CONSTRUCTION
  - Extensive mobilization under tight timelines
    - Work sequenced by region
    - Streamlined communication in having all resources managed under same roof
    - Availability of replacement resources in the event of needed substitutions
  - Effective planning critical as delays at any location had the potential to have an escalating effect.
  - Issue resolution on site
    - Diversity of ground conditions and unmarked utilities across the province called for unanticipated changes.
    - Close collaboration between Schneider Electric and internal design and construction teams allowed for timely adjustments in the field
    - Having qualified field personnel allowed EPCOR to diagnose and adjust in the field
  - Different variations of tower foundation design:
    - Pre-cast foundations
      - Must factor in time to manufacture
    - Poured-in-place custom foundations
      - Expensive, especially in winter when heat is required
    - Poured-in-place foundations using standard sleeves
      - Fastest, easiest approach
  - Cell boosters required

AT RWIS Project

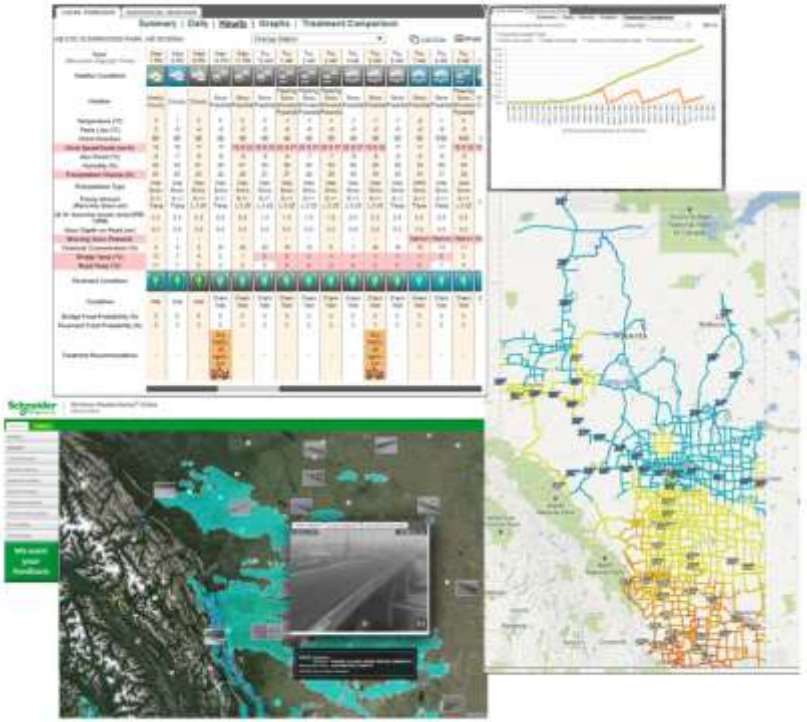
Best Practice Deployment Strategies

- OPERATION & MAINTENANCE
  - Utilize automated diagnostic monitoring & remediation where possible.
    - Technology improvements can move faster than contractor can implement
    - Schneider Electric plans to again upgrade these capabilities for this project
  - Proactive replacements and upgrades reduce the requirement for emergency repairs.
  - Translation of “performance based contracting” into practical metrics that could be consistently and objectively calculated and demonstrated.
  - Utilize station configurations and technologies that can accommodate ongoing evolution of the network.
    - Requires significant stakeholder coordination
  - Concepts, technologies and implementation approaches need to be periodically challenged and new strategies deployed to keep the system cost effectively up to date.

AT RWIS Project

New Technologies

- Video Traffic Management System (VTMS)
  - Design and build the VTMS cabinets to interface with Calgary Traffic Management Center
  - New camera lowering device – first time in Alberta
  - Concrete poles - does not require foundation
  - Rural sites
    - No high speed communication
    - No traffic control centres
- Maintenance Decision Support System (MDSS)
- Interaction with Dynamic Message Signs (DMS)
- Automated Vehicle Location System (AVLS)
- Mobile - Smart phone app



AT RWIS Project

Mobile Connections

- Alberta 511 - Informed travellers can maintain mobility across the province.
  - Web Site
  - Mobile App
  - Maintenance personnel to monitor the system.
  - Camera images and RWIS data included

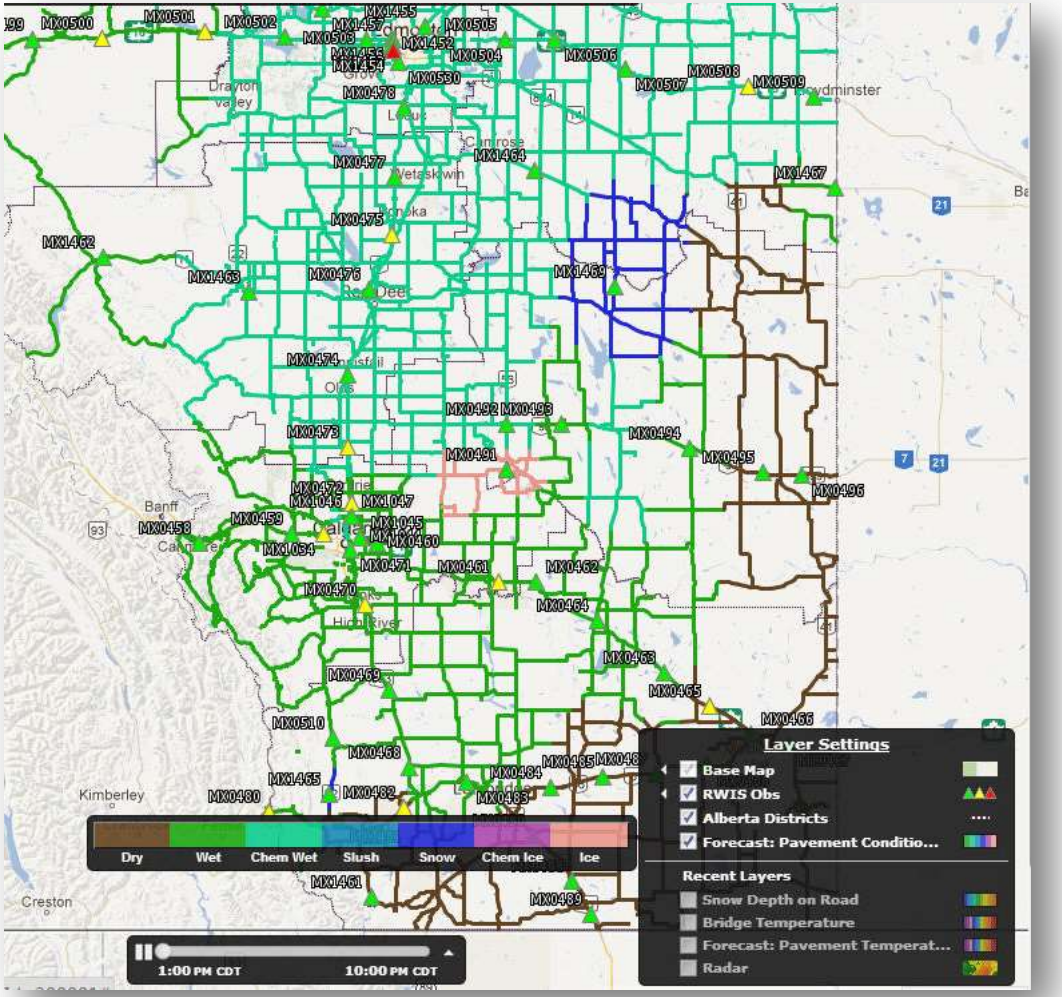
AT RWIS Project

Benefits to Alberta Transportation

- Better Road Information for AT and their Highway Maintenance Contractors
  - Accurate view of current road conditions
  - Forecast of what will likely happen along each maintenance route for 36 hours
  - Guidance through treatment recommendations

RESULT

Safer roadways for the motoring public



AT RWIS Project

Benefits to Alberta Transportation

- Alberta's 511 system now has better information:
  - Camera views of road conditions
  - RWIS data available
  - Mobile access

RESULT

Travellers make better timing and route decisions when they are well informed about road conditions

Thank you!

Jeremy Duensing
Transportation Product Manager
Schneider Electric
Jeremy.duensing@telventdtn.com
+1 952-882-4554

Shawn Truelson
Transportation Industry Manager
Schneider Electric
shawn.truelson@telventdtn.com
+1 612-382-5318

Nathaniel Papay, P.Eng., PMP
EPCOR Technologies
npapay@epcor.com
+1 780-412-3684

Schneider Electric