

Intelligent Transportation Systems in Small Cities and Rural Areas

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March 20, 2001

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What are Intelligent Transportation Systems?

- The application of sensor, computer, electronics, and communications technologies and management strategies in an integrated manner - providing traveler information to increase the safety and efficiency of the surface transportation system.

Major ITS Areas

 Multimodal Regional Traveler Information	 Transit Management	 Incident Management
 Freeway Management	 Electronic Toll Collection	 Emergency Management
 Traffic Signal Control	 Electronic Fare Payment	 Highway Rail Intersection Safety

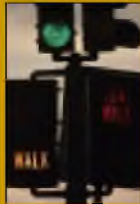


Multimodal Regional Traveler Information





Traffic Signal Control



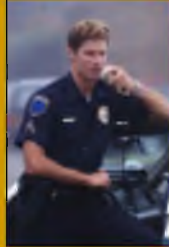


Incident Management





Emergency Management





Electronic Fare Payment





Highway Rail Intersection Safety





Transit Management





Electronic Toll Collection





Freeway Management





Commercial Vehicle Operations



Rural Situations



- Challenging geography, weather events, and road conditions
- A sparse telecom infrastructure
- Limited public transportation
- NOT one size fits all

Rural Context



- Limited services between communities
- 78.5% of mileage traveled is rural
- 39.4% of vehicle miles traveled is in rural areas
- 68.4% of crash fatalities occur on rural highways

Rural ITS Includes

Mayday Systems

Road Weather Information Systems

Ice Ahead

Rural ITS Includes

- Automatic Gate Closing Systems
- Advanced Traveler Information Systems for Rural Tourist Destinations
- Crash Prevention Systems

Rural Mayday Systems



- Rural mayday systems are designed to bring help quickly to stranded and injured motorists.
- Cellular technology is used to relay calls for help to emergency response providers.
- Advanced systems are currently being tested in Buffalo, New York and Rochester, Minnesota that automatically signal for help after a substantial crash.

Road Weather Information Systems (RWIS)

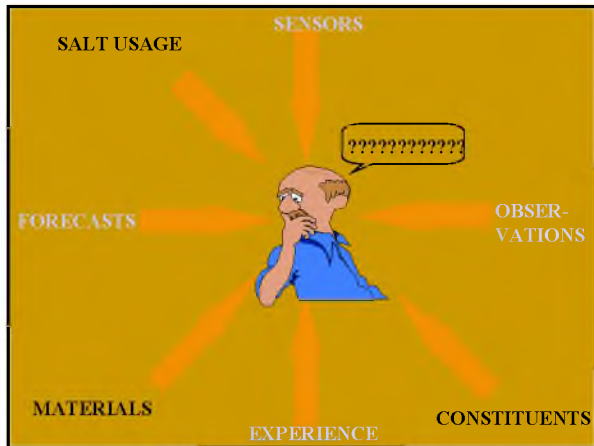
The use of weather sensors placed strategically along the highway or on vehicles to provide near real-time data of highway weather and pavement temperature conditions, combined with tailored weather and pavement condition information, to provide road maintenance managers and the general public with a decision tool for snow and ice control and route planning.

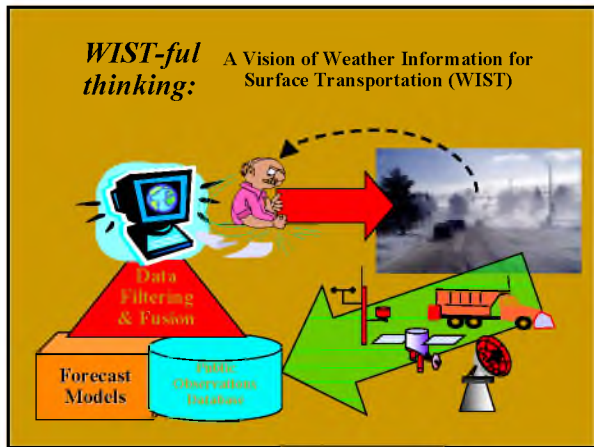


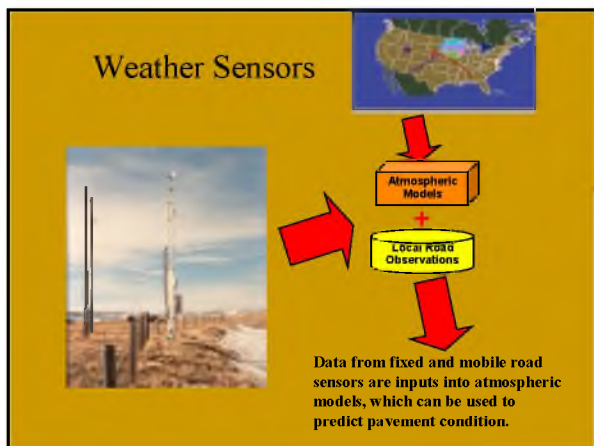
Every Year in the United States

- Nearly 7,000 fatal highway crashes and over 450,000 injury crashes occur annually
- \$2.5 billion is spent annually for snow and ice control
- About \$5 billion is spent on weather related infrastructure damage
- Billions of dollars are lost in delay and disruption to trips and production ... because of weather

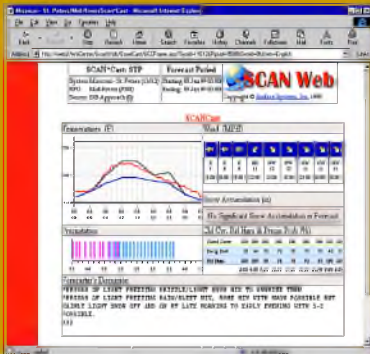








Private Vendors



What is FORETELL?

- Cooperative project with the Iowa, Minnesota, Missouri and Wisconsin DOTs
- Predicts future weather and road condition information
- Detailed forecast conditions up to 24 hours from now

Types of Information Available from FORETELL

- Precipitation (type and intensity)
- Temperature (air and dew point)
- Pavement Temperature
- Road Condition Index (predicted)
- NWS Watches and Warnings
- Cloud cover
- Wind (speed and direction)

How does FORETELL work?

- Uses National Weather Service (NWS) model data
- Increases time and space resolution of model results giving us a better defined outlook of conditions
 - In terms of where precipitation will occur
 - In terms of when to really expect it

How does FORETELL work?

- Provides hourly detailed weather information
- Info on a 10 km grid not the 80 km NWS grid



Precipitation (type and intensity)



www.foretell.com Website

- Can view information either statically or animated



RWIS in the Midwest

- Wisconsin - 56 RWIS stations
- Iowa - 50 RWIS stations
- Illinois - Illinois DOT operates 54 RWIS stations, another 14 on the the Illinois Tollway
- Minnesota - 92 RWIS stations
- Indiana - 9 RWIS stations on Indiana Toll Road

Future RWIS Improvements

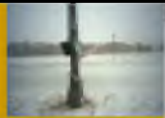


- New sensor technologies
- New sensor siting guidelines
- New NTCIP Environmental Sensor Station Standards
- Improved RWS feeds and data sharing
- Better road condition models
- Open systems development for information exchange
- Data fusion of multiple data sources and scales

Minnesota Automatic Gate Closing



Minnesota Automatic Gate Closing



- The Minnesota DOT has gates installed on 43 ramps on I-90.
- \$160,000 is being spent by the Minnesota DOT to automate the gates.
- Benefits include a reduced number of accidents and reduced safety risks for law enforcement and snow maintenance teams.

University of North Dakota ATWIS -- #SAFE



- Forecasts weather for six hours into the future
- Forecasts weather for 60 miles in direction traveling
- 94.3% believe that they will benefit from #SAFE in the future

Advanced Snowplow



- **Lane Positioning**
 - Tolerance Edge
 - Current lateral position
 - Prediction marker
- **Collision Warning**
 - Forward
- **Partners**
 - Caltrans
 - ADOT
 - UC - Berkeley
 - UC - Davis
 - WTI/MSU

Advanced Traveler Information Systems

- Advanced Traveler Information Systems (ATIS) provide information to travelers on road conditions, congestion, weather conditions, and tourist attractions
- Common ATIS media include Variable Message Signs, Highway Advisory Radio and the Internet

Variable Message Signs

- Variable message signs are used to alert travelers to traffic delays
- Can give alternative route information to drivers.
- Weather conditions can also be displayed.



Highway Advisory Radio

- Highway Advisory Radio is a way to disseminate information to travelers about congestion and tourist attractions.
- Some signs have lights that flash when an important message is being aired.



The Internet

- Many jurisdictions are currently disseminating traffic and traveler information via the Internet.
- Traffic data over the Internet is often real time.

Branson Internet Site

- Provides information about traffic congestion, alternative routes and such attractions as Mel Tillis, Yakov Smirnoff, Chinese Acrobats, Wayne Newton, Mickey Gilley and the Miss USA Pageant .
- <http://branson.tripusa.com>



Yosemite Internet Site

- The Yosemite Area Traveler Information system provides current information to travelers on Yosemite National Park and five surrounding counties.
- Information on traffic, weather conditions and recreational facilities is provided at www.yosemite.com



Springfield, Missouri

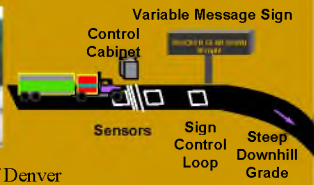
- The Springfield Transportation Management Information Center receives feeds from many cameras and detectors throughout the city, and transmits changes in signal timing based on that information.
- Camera feeds are shown on a local television station.
- In the future traffic information will be shown on kiosks and the Internet.

California Dynamic Speed Warning



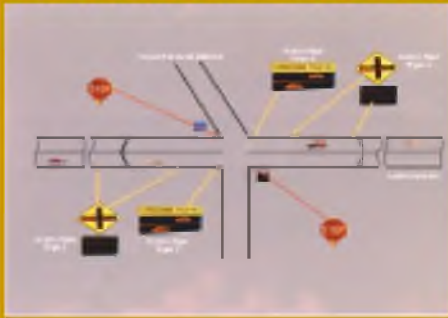
- 10' X 7' full LED matrix
- Radar Unit
 - 18 Degrees
 - 15-120 mph and 2500 feet away
- 2 Fixed Closed Circuit Television Cameras
- Video Vehicle Detection System
- Controller and Phone Line

Dynamic Downhill Speed Warning System

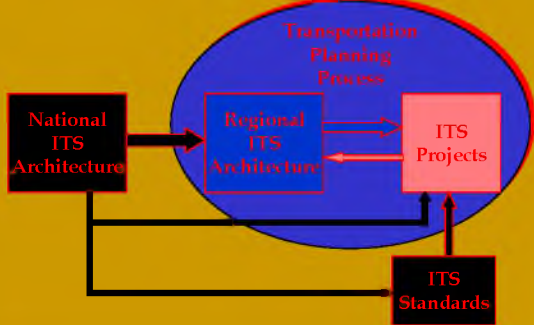


I-70 Westbound, west of Denver
Eisenhower tunnel leads into Straight Canyon
10 miles at 7% grade
Annual traffic count approaching 5 million
About 20 runaways & 15 truck related crashes per year

Intersection Collision Avoidance



ITS Planning Vision



Stakeholder Involvement



- Which stakeholders should be involved?
 - Start with those involved with transportation planning, operations, or ITS development
 - Expand participation beyond the “usual suspects”
 - National ITS Architecture can be of help
 - Wide range will encourage broader consideration of integration opportunities

Stakeholder Involvement on the Acadia National Park ITS Committee

- National Park Service
- Maine DOT
- Federal Highway Administration
- Federal Transit Administration
- Downeast Transportation
- Friends of Acadia
- Town of Bar Harbor

Stakeholder Involvement on the Acadia National Park ITS Committee

- Town of Southwest Harbor
- Town of Northeast Harbor