COATS: A Decade of Rural ITS

David Veneziano and Doug Galarus
Western Transportation Institute – Montana State University

Sean Campbell
Caltrans Division of Research and Innovation

Ian Turnbull
Chief, Office of ITS Engineering and Support, Caltrans District 2
Overview

- Origins
- COATS
- COATS Showcase
- COATS Phase 3
- COATS Phase 4
- Spinoff Products
- Future Directions
- Conclusions
Origins

- **1991** - California Department of Transportation (Caltrans) inquired into rural concerns dealing with advanced transportation technologies
- **1995** - Initiated a Program for Advancing Rural Transportation Technologies (PARTT), a rural ITS scoping study
  - Reviewed advanced transportation technologies, identified key issues concerning them, and developed conceptual ideas for future activities
  - Geographic area in Northern California designated a study area to refine the need and application of ITS in a rural environment
  - Caltrans and the Oregon Department of Transportation (ODOT) expanded the Northern California study area into Southern Oregon to maximize resources, foster cooperation, and investigate feasibility of ITS in a bi-state study area
- **1998** - Western Transportation Institute (WTI) at Montana State University, Bozeman, selected to carry out further study
  - Entitled COATS
  - Focused on ITS planning and architecture, with deployment of an early-winner project
- 80,000 sq mi area
- Major population centers: Redding, CA; Eugene and Medford, OR
- Diverse geography
- Region joined by several North-South arteries
  - Interstate 5, U.S. 97, 101, 199 and 395

Western Transportation Institute
Identified Regional Challenges

- Safety issues
- Nonrecurring congestion
- Freight movement issues
- Incident response issues
- Mobility issues
- Tourism issues
- Environmental impacts
COATS Products

• A number of products produced by the initial effort
  – Architecture Report – defined framework for how systems and stakeholders would interact
  – Business Plan – established plan to make decisions and organization structure to support them
  – Candidate Early Winner Projects – proposed initial, small-scale projects/systems
  – Conditions and Performance Report – identified challenges, their magnitude and geographic scope
  – Legacy Systems Report – summarized existing transportation systems and planned improvements
COATS Products cont’d

- Operations and Maintenance Guidance – documented operations and maintenance needs associated with ITS infrastructure
- Project Infrastructure Report – proposed potential ITS infrastructure for the region
- Stakeholder Outreach – solicited views on transportation challenges and perceived solutions for the region
- Strategic Deployment Plan – summarized work to date and described approach to implementation
- Traveler Needs Survey – determined what information rural travelers needed and wanted, the medium they wanted this through, and where they wanted it presented
COATS Summary

- Initial effort identified several regional needs that ITS could address
- Determined a series of “early winner” projects that could demonstrate rural ITS
- Established an orderly approach that could be employed when developing rural ITS for the region
- Aided the establishment of rural TMCs in CA
  - Redding and Eureka built during first phase of COATS
COATS Showcase

• Second phase of COATS: 2001 - 2006
• Built upon the foundation of ITS Strategic Deployment Plan
• Focused on demonstration and evaluation activities
  – Implemented “Early Winner” projects identified in COATS
  – Provided funding for increased deployment and evaluation
• Provided data to justify, support and direct future ITS deployments
Showcase Projects

• #1: Siskiyou Pass Traveler Information and Incident Management
  – Evaluate traveler information ITS and develop incident management and winter response plans
• #2: Operational Impacts of Weather and Lane Closures on Rural Highways
  – Establish the correlation between rural highway volume, capacity or travel speeds, and weather events
Showcase Projects cont’d

• #3: ITS Maintenance Evaluation
  – Document maintenance history associated with various ITS elements and provide lessons learned to guide future deployments

• #4: Evaluating Accuracy of RWIS Sensors
  – In-field comparison of existing RWIS puck sensors and infrared technology

• #6: ITS Maintenance Workshop
  – Train DOT staff on ITS maintenance, answer questions about ITS equipment and share experiences
Showcase Projects cont’d

• #7: Public Safety and Communications State of the Practice
  – Outline issues in the area and present solutions from an EMS and incident management perspective

• #10: Communications and Power Improvements for Rural Field Devices
  – Document innovative solutions for addressing communications and power needs of rural ITS field devices
Showcase Projects cont’d

• #12: Evaluation of ITS Technologies in Rural Work Zones
  – Design and test of a means to provide real-time delay information to motorists in a rural two-lane undivided highway work zone with a lane closure

• #13: Narrows Oversize Vehicle Identification System (NOVIS)
  – Develop a system to detect vehicles exceeding specific width and length thresholds and provide information to motorists, truckers and enforcement
Showcase Projects cont’d

- **#14: Evaluation of the Fredonyer Summit Icy Curve Warning System**
  - Determine whether icy curve warning system improved motorist safety
- **#15: Comparative Evaluation of Automated Wind Warning Systems**
  - Determine if technologies deployed to automatically warn motorists of windy conditions actually improve safety
Showcase Projects cont’d

• #16: Development of a Roadway Weather Severity Index
  – Quantify the relationship between winter weather severity and highway safety

• #17: Video Surveillance Trailer Equipment
  – Develop video surveillance trailer platforms for data collection and address challenges associated with their use and repair

• #21: Development of Criteria to Identify Locations for ITS Deployment
  – Developed quantifiable criteria to select ITS technologies using ODOT data and assist in prioritizing potential locations for deployments
Showcase Summary

- Impetus for long-term partnerships – i.e. Snowflake group
- Identified which elements were ready for wider deployment and which were not
- Developed innovative solutions to unique problems
- Determined impacts of weather on transportation in the region
COATS Phase 3

- Research and support activities to continue fulfilling COATS vision
  - Foster bi-state cooperation
  - Promote technology transfer
- Initiated Western States Rural Transportation Technology Implementers Forum
- Investigated Integrated Corridor Management for a rural environment
Western States Forum

- Western States Rural Transportation Technology Implementers Forum
- Engineering practitioner’s conference held annually since 2006
- Two days of discussion and demonstration of practical applications and technical issues associated with Rural ITS
  - Promote transferability of solutions and knowledge across the ITS community
Western States Forum

Number of Individual Participants

Number of States Represented

State Representation

Made possible by a partnership between WTI/UTC and Caltrans

2006—CA, ID, MT
2007—CA, MT, NV, OR, WA
2008—CA, ID, MT, NV, OR, WA, WY
Western States Forum

• Previous Presentations
  – A Tale of Two RWISs (RWIS Trials and Tribulations)
  – Caltrans District 9 Mountain Pass Signs
  – Fiber Optic Network/Topology Design on State Highways
  – Improving Traffic Data Collection Using Wireless Technology
  – Microwave Communications for Rural ITS Applications
  – Oregon DOT Traveler Information Systems
  – Redding Responder Project: Mobile Data Communication Challenges and Solutions in Remote Rural Areas
  – TMC-TMS Communications: Overview and Demonstration
  – Unlicensed Wireless Multipoint System in Sacramento Metro
  – Washington DOT Field Tests of Wireless and Microwave Vehicle Detection Systems
  – Weather Warning Systems in Oregon and Region 5 Interstate Access Gates
  – Web-Based ITS Field Element Control
  – Weigh-In-Motion NOT DONE ON A WIM!
Rural ICM

- Explored the concept in rural context
- Developed platform to facilitate bi-state data-sharing between OR and CA
  - Meets long-time COATS objective of fostering bi-state cooperation
- Facilitated development of offshoot efforts
  - One Stop Shop for Rural Traveler Information
Rural ICM

Present communications...

Future approach...

COATS Region Integrated Corridor Management System

- Central Point TOC
- Redding TMC
- Salem TOC
- Bend TOC
- West Coast Corridor Coalition
- Local Police
- Local Fire
- California Trucking Association
- Other Traffic Management Agencies

CHP
OSP
Data Sharing
Phase 3 Summary

- Initiation and expansion of outreach efforts via Western States Forum
- Progress toward sharing of data in near-real time
  - Build new avenues of data-sharing between OR and CA
- Investigation of rural ICM applications proved feasible and advantageous
COATS Phase 4

- On-going work
- Continued outreach and tech transfer via Western States Forum
- Examination of developed technologies deployment
- Continued evaluation of existing/emerging issues
  - Radar Speed Trailer deployment warrants
  - Evaluation of speed and crash trends related to Fredonyer ICWS
  - Explore spinning off mature COATS-related technologies
  - Explore expanding COATS area into Washington, Nevada and bordering districts.
COATS Spinoffs

• COATS has served as the motivating factor for a number of spinoff products
  – Web Based Field Element Control
  – Responder
  – Weathershare
  – Automated Safety Warning System Controller
  – One Stop Shop for Rural Traveler Information
  – TMC - TMS Communication Systems
  – Professional Capacity Building
  – Communications for Rural ITS
The Future

- Vision: Continued and expanded innovative partnerships, technology and education to facilitate and enhance safe, seamless rural travel throughout the COATS region and the western United States
- Continued use of COATS in the development of spinoff products/systems (One Stop Shop, Responder, etc.)
- Continued outreach and tech transfer efforts
- Innovative ITS development/deployments and evaluations as needed
- Possible expansion to neighboring states
Conclusion

• 10+ years of successful bi-state partnership
• Continues to emphasize the needs of rural areas and practitioners
• Numerous innovative systems and approaches developed and evaluated
• Several plans and deployments presently in use addressing rural concerns
• Provides a platform for outreach and tech transfer
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Questions?