Overview/Agenda

- Welcome / Introductions / Recent ITS Activities
- General Status of the WSRTC
- Clarus One Stop Shop Update
- Year 1 Incubator Project Update/Overview
- COATS Phase 4 Project Follow-up
- Other discussions (as needed)
Roundtable of Recent ITS Activities
General Status of the Western States Rural Transportation Consortium
Clarus One Stop Shop
The goal of this Broad Agency Announcement (BAA) is to support research and scientific study on the use of Clarus System data to improve surface transportation weather management/operations, create innovative interfaces, and/or develop new applications including weather-responsive traffic management tools. The FHWA anticipates making up to seven (7) awards, but reserves the right to make more or fewer than seven (7) awards.
WTI Proposal

• Proposal Submitted on Time
• Included signed letters of support from WSRTC member states: California, Oregon, Washington and Nevada

• GOAL: Expand the One-Stop-Shop Prototype to Cover all of California, Oregon, Washington and Nevada
  – … to address the shortcomings of current (multi-state) web-based weather information sources for travelers (and DOT personnel) …

• Project awarded on 9/24/2010
Progress

• We’re close to having the site ready for review by FHWA and Consortium members.
• We need to check functionality and address what is missing.
• In general, we have included all of the anticipated data sets, including coverage of Washington with nearly all layers.
A Preview ...
The Layers

- Current Weather
  - Air Temperature
  - Relative Humidity
  - 1 Hour Precipitation
  - 24 Hour Precipitation
  - AHPS 24 hr Precip
  - Wind
  - Clarus Stations

- Forecast Weather
  - Air Temperature
  - Wind Speed
  - Wind Gust Speed
  - Humidity
  - Sky Cover
  - 12-Hour Chance of Precipitation
  - 6-Hour Precipitation
  - Snow
  - Weather

- Road/Travel Conditions
  - Chain Requirements
  - Road Information
  - Incidents
  - CMS
  - CCTV

- Other Traveler Info
  - Rest Areas
  - Features of Interest
  - Truck Scales
  - Summit Locations
Clarus Data
CCTV Images
Route Coverage: Los Angeles to Seattle
CCTV Images convey a lot of information ...
**HATCHERY CREEK RD**
Updated: 5:17 PM MDT - Mon, Jun 6 2011
Type: Construction
Route: 002
Milepost: 91.00
Description: On US 2, west of Leavenworth in Tumwater Canyon Wednesday and Thursday ONLY from 7 a.m. to 4 p.m., on Wednesday and 7 a.m. to noon, on Thursday, expect up to 20 minute delays with single lane flagger controlled traffic while WSDOT Geotech Engineers measure the slope for the steel netting that will be hung when these slopes are stabilized later this summer.
Advice:

**UMPQUA**
Updated: 8:05 AM MDT - Thu, Jun 9 2011
Type: Maintenance Work
Route: ORE38
Milepost: 18
Severity: Estimated delay under 20 minutes
Description: Traffic control with flaggers for brush cutting crew.
Advice:

**Junction w/Route 395 to End of Pavement**
Updated: 8:01 AM MDT - Thu, Jun 9 2011
Type: Highway Construction
Route: 270
Milepost: 0
Description: Estimated delay: 20
Advice:

**None**
Updated: 8:42 AM MDT - Thu, Jun 9 2011
Type: Lane Closure
Route: 090
Milepost: 111.00
Description: Lane Closure for maintenance work on I-90 west bound between milepost 111 to milepost 110 beginning at 7:40 AM on June 09, 2011 until 3:11 AM.
Advice:

**PACIFIC**
Updated: 8:00 PM MDT - Wed, Jun 8 2011
Type: Commercial Vehicle Information
Route: 1-5
Milepost: 0
Severity: Informational only
Description: Effective May 24, 2011, this section of I-5 will be restricted to 16 feet 00 in. in width between the hours of 7:00 AM & 7:00 PM (DAYTIME). Estimated date of completion is June 30, 2011.
Advice:

**THE DALLES-CALIFORNIA**
Updated: 11:46 AM MDT - Tue, Jun 7 2011
Type: Information
Route: US97
Milepost: 68.9
Severity: Informational only
Description: Cow Canyon Rest Area closed for construction 3/7/11 through 6/25/11.
Advice:
Weather Forecasts
Brief Live Demonstration

• If time, network, etc. allow …
# Tasks and Deliverables

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**Contract Start = 9/24/2010**  
**Actual Start = 11/1/2010**  
**End = 9/23/2011**

**Duration = 12 months**  
**Amount of Award = $79,995**
Year 1 Incubators
Year One Projects

- Survey of Western State Safety Warning Devices
- Regional Integrated Corridor Management Planning
- Status – Startup pending contract execution, anticipated June/July
- Workplans finalized
Survey of Safety Warning Devices

• Synthesis of existing safety warning devices in the western U.S.

• Contact entities to obtain specific information of interest
  – Identify location of existing deployments, their function/purpose, and other info
Survey of Safety Warning Devices

• Approach
  – Identify devices of interest and develop questionnaire
    • Work in conjunction with WSRTC members
  – Identify and contact agencies/staff
    • Personal contact via telephone calls
  – Summarize data and produce report
  – 12 month timeline
Regional ICM Planning

- Revised based on steering comm. Feedback at November meeting
- Establish guidance and criteria to initiate, plan and develop rural ICM plans
  - Define what rural ICM is and establish factors to consider
- Apply results of USDOT Integrated Corridor Management initiative to the rural environment
Regional ICM Planning

• **Approach**
  – Literature review
  – Document current ICM planning protocols
    • i.e. USDOT ICM initiative
  – Document current emergency operations center protocols
    • i.e. what are WSRTC agencies doing
  – Develop rural ICM planning protocols/process
    • Solicit Steering Comm. feedback on candidate test route(s)
Regional ICM Planning

• Approach cont’d
  – Route inventory for selected route(s)
  – Apply developed criteria to study route(s)
  – Final report

• Timeline – 12 months
COATS Phase 4 Project Updates

• Rural Deployment Assistance
• Fredonyer Pass Icy Curve Warning System (ICWS)
Rural Deployment Assistance:

Analysis and Recommendations for Optimization and Deployment of WeatherShare and Related Web-Based Projects
Multiple Projects on a Similar Platform

- WeatherShare
- Integrated Corridor Management Clearinghouse (ICM)
- Caltrans One Stop Shop for Traveler Information
- Integration of Aviation Automated Weather Observation Systems (AWOS) with Roadside Weather Information Systems (RWIS)
- Clarus One Stop Shop
- WSRTC One Stop Shop (Phase 2)
Challenges

- Still in research and development mode – need to move to production
- Fragmented code-base with a lot of redundant code, data, etc.
- Non-optimal code
- Lack of scalability
- Poor logging/tracking – made analysis difficult.
- Hard to characterize use – seasonal components, mixed user types, etc.
- Use has been relatively limited
- Need to plan for expanded coverage area
- Hosted at Montana State University
Analysis

• System Performance
  – Networking (incoming and outgoing)
  – Storage
  – CPU
  – Memory

• Implementation
  – Software
  – Database
  – Documentation
  – Support
Hosting Alternatives

- Dedicated Server
- Dynamic Cloud Server
- Elastic Cloud Server
Recommendations

• Implement optimizations such as server-side compression of text files
• Determine whether or not archiving is necessary
• Re-factor code
• Put greater emphasis on system documentation, on-going support, maintenance, re-use and scalability
• Investigate hosting options further, particularly “elastic” options – dynamic expansion
Fredonyer Pass Icy Curve Warning System
Fredonyer ICWS

- Project objective: evaluate the operational, safety and maintenance aspects of the ICWS
- Status: Revising analysis to incorporate chain control data and finishing report
- Preliminary results: indicate system appears to have reduced crashes and lowered speeds
Fredonyer ICWS

• **Tasks:**
  – Literature review update
  – Analysis of radar speed data
  – Analysis of crash data
  – Document maintenance aspects
Fredonyer ICWS Crash Analysis

• Examine crash data and trends before and after the deployment of ICWS
• Used observational before-after study method employing the Empirical Bayes technique
  – Addresses concerns such as regression to the mean, changes in traffic flow, and other factors
  – Used 4.5 years of before data (January 1, 1998 – June 30, 2002) and 1.5 years of after data (July 1, 2008 – December 31, 2009)
Fredonyer ICWS Crash Analysis

• Results
  – Calculating the index of effectiveness ($\theta$), ICWS reduced crashes by 18% during after period (annual)
    • Assumption that changes in crashes attributed to presence of the ICWS, as no other geometric or safety improvements were made during the study period
    • Ongoing work examining chain control status and crashes has indicated that only two crashes occurred shortly before R-1 chain control implemented (data available from 2008-2009)
Fredonyer ICWS Crash Analysis

- Observed crash rates by severity also improved

<table>
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<th>Study Period</th>
<th>Crash Rate (ice-related crashes per winter season)</th>
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<td></td>
<td>Total</td>
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<td>Before</td>
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<td>After</td>
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- Indicates that vehicles may be traveling slower = lower severity
- Based on these improvements, estimated safety benefit of $1.7 million
Fredonyer ICWS Speed Analysis

- T-tests employed to determine statistical significance between speeds
- Speeds differences of 0 mph, 3 mph and 5 mph examined
- Speeds evaluated for system state (on/off), day/night and weather
Fredonyer ICWS Speed Analysis

• System state
  – Speeds were significantly lower at 0 mph, 3 mph and 5 mph when system was on

• Day/Night
  – Speeds were significantly lower at 0 mph, 3 mph and 5 mph when system was on during both day and night
Fredonyer ICWS Speed Analysis

• Weather
  – Speeds were significantly lower at 0 mph, 3 mph and 5 mph when system was on during both day and night
  – Day - mean speeds fell between 6.20 mph and 10.73
  – Night - mean speeds fell between 10.34 mph and 16.14 mph
Fredonyer ICWS Speed Analysis

• Clear Cold Dry/Not Dry
  – Mean speeds different at 0 mph during day and night when signs on
  – Mean speeds different at 3 mph during day and night when signs on
  – Only limited number of mean speed differences greater than 5 mph
  – Appears ICWS prompts approximately 3 mph speed reductions when icy roads are not necessarily expected
Fredonyer ICWS Conclusions

- Crashes – initial results indicate that crashes have been reduced by approximately 18%
  - Only evaluated 1 ½ years of “after” data
- Speeds – system appears to reduce speeds by approximately 3 mph during clear, cold and not dry conditions
  - Results pertain to sites prior to curves; greater reductions are possible/hypothesized as vehicles traverse curves
Discussion
Items

• Upcoming meetings
  – Next Consortium meeting – August at NRITS in Coeur d’Alene, Idaho
    • Scheduled for Wednesday, August 31\textsuperscript{st} from 1:00 – 4:00 PDT
  – November Steering Committee Meeting – tentatively scheduled for November 8, 2011 in Yreka
Wrap-up