Integrating the Surface Transportation Weather Information: An ITS System for Northern California

www.weathershare.org

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Agenda

• Background
• Scope
• Problem Statement & Vision
• System Briefing
• Conclusions
• Acknowledgements
WeatherShare Project

- Redding Incident Management Enhancement (RIME) program, 2003
- Multiple stakeholders
  - Caltrans District 2
  - Caltrans Redding TMC
  - California Department of Forestry (CDF)
  - California Highway Patrol (CHP)
  - Shasta Area Safety Communications Agency (SHASCOM)
  - NorCal Emergency Medical Services (EMS)
Goal of the Project

- To streamline and integrate currently available road weather data in the region into one single source easily accessible by incident responders and potentially the traveling public.
Region of Interest

Counties in CTD2
Counties in CTD1
Counties in RIME Region
Counties in CTD3
Methodology

- **Phased approach**
  - goes through the V-model in an iterative manner
  - to minimize potential risks

- **System engineering tools**
  - Project Plan
  - Concept of Operations
  - User Requirements Analysis
  - Configuration Management Plan
Problem Statement

• Abundant road weather information, separate sources, various interfaces
  - Inefficient and time-consuming

• Use of the data has not yet reached its full potential
  - Potential applications in new program

• Desire for easy access and integration & quality control of road weather data
Vision

- A surface transportation weather application
- Allow users to view a compilation of all available road weather data from various sources in Northern California
- Greatly increasing the efficiency of situation assessments for various purposes
WeatherShare Characteristics

- Leveraging resources
- Road weather data sharing and integration
- Weather data standardization and quality control
- An easy-to-maintain, cost-effective product powered by an open-source web platform (Linux/Apache + Perl + MySQL + PHP)
- Scalable, interactive map displays powered by the SVG technology
- Customizable, individualized user interfaces powered by the PHP Smarty template system
- Database-driven web pages powered by the MySQL technology
Multi-tier System Architecture

- **Data Presentation**
  - HTML Client
  - Adobe SVG Plug-in 3.0

- **Business Logic**
  - Data Parsing
    - Fetch data and parse into MySQL database
  - Quality Control
    - 3 Levels Quality Control for weather data
  - User Privilege System
    - User management
    - User profile system
  - SVG mapping
    - Dynamic generation of the SVG layer for air temp., wind, etc.

- **Data Storage**
  - MySQL Server
  - XML/ SVG
The WeatherShare Interface
Temperatures from Stations Reporting within the Past Hour

Latest Data Updated at: 2005-03-29 12:11:12 PST
Wind Readings from Stations Reporting within the Past Hour
Data Can be Viewed in Context
Alerts/Thresholds Defined by Authorized Users
Other System Features

1. Automatically push road weather information to the user every 5 minutes.
2. Use a map display that permits the user to zoom into, zoom out of, or pan into the area of interest.
3. Allow the user to turn on/off various data layers on the interactive map display.
Other System Features (Cont’d)

4. Apply quality control procedures for all the real-time reporting stations

5. Allow the user to track historical data for a period of up to one year from present

6. Backup the road weather data on a daily basis and implement a backup mechanism for the server as well
Conclusions

• WeatherShare has served as a regional showcase and proof-of-concept for the national priority: better weather info. for surface transportation.

• Due to the involvement of multiple stakeholders and the complexity of institutional and technical issues, it is important to develop partnerships among organizations in order to promote the successful integration of road and weather data from various sources.

• In building a successful ITS system that can meet the users’ needs, it is crucial to involve the users and stakeholders from its very early stages of design and development and throughout its lifecycle.
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Questions

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<td>• Road Wx data sharing &amp; integration (regional)</td>
<td>• Project Plan</td>
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Next Steps – Phase II

- Improved functionality of the system
- Extended geographic coverage
- More comprehensive evaluation