



Caltrans Division of Research,
Innovation and System Information

Research Results

Transportation
Safety and
Mobility

MARCH 2013

Project Title:

Intelligent Roadway Information System (IRIS) Technical Support and Testing

Task Number: 1777

Completion Date: December 31, 2011

This project tested, enhanced, and implemented a unified, open source traffic management software system tailored to meet the requirements of Caltrans rural districts.

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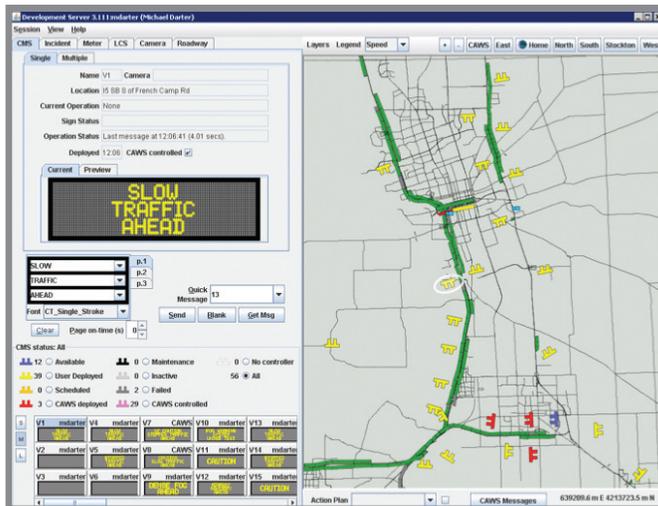
Intelligent Roadway Information System (IRIS) Transportation Management Software

Implementing a low-cost integrated traffic management system for rural areas to improve the mobility and safety of travelers

WHAT WAS THE NEED?

The Caltrans urban Transportation Management Centers (TMCs) use the Advanced Traffic Management System (ATMS) software tool, which provides real-time information on highway conditions to detect traffic incidents, manage the flow of traffic, and disseminate traveler information. ATMS helps Caltrans reduce commuting times, maximize roadway capacity, and generally provide safer traveling routes. It also provides operators with unified access and control to multiple types of roadway devices rather than having to operate disparate systems.

ATMS is composed of several proprietary software solutions that are expensive to acquire. The recurring maintenance costs have also been increasing. Caltrans rural districts often cannot afford the initial setup cost, let alone the recurring costs associated with development and operation. In addition, rural districts do not have the same mobility needs as large metropolitan regions and therefore do not require many of the advanced features and capabilities that ATMS provides. As a result, Caltrans rural districts have addressed traffic management by developing disparate solutions with non-uniform management, administration, and operating protocols.



IRIS user interface



Caltrans improves mobility across California by performing applied research, developing innovations, and implementing solutions.

WHAT WAS OUR GOAL?

The goal was to enhance, test, and evaluate the Intelligent Roadway Information System (IRIS) software, a low-cost open-source alternative for rural districts that provides functionalities comparable to the ATMS software.

WHAT DID WE DO?

The Minnesota Department of Transportation (DOT) developed the open-source IRIS software tool and made it freely available in 2007. IRIS offers a collaborative and shared-development environment. Caltrans is the first transportation agency to adopt IRIS and explore its capabilities. The demonstration location chosen was Stockton in Caltrans District 10. A pilot test with limited features was also performed in Districts 1, 2, and 5.

The UC Davis Advanced Highway Maintenance and Construction Technology (AHMCT) Research Center, in partnership with Caltrans and the Minnesota DOT, did the following:

- Collaboratively developed enhancements and extended IRIS to be compatible with the Caltrans District 10 infrastructure and field devices.
- Adapted IRIS to match the district's specific nuances and operational needs.
- Integrated IRIS with existing District 10 hardware and software systems. Enhancements were contributed back to the Minnesota DOT for use by other public and private agencies.
- Modified IRIS to assume the functions of a legacy middle-ware system that was responsible for acquiring all vehicle detection and weather information from field devices as well as the Automated Warning System for District 10.
- Performed extensive user acceptance and operational testing prior to deployment.

WHAT WAS THE OUTCOME?

IRIS is fully deployed in District 10. The number of software applications and servers in District 10 has been reduced, with IRIS assuming more roles. The system is reliable and flexible and provides a unified tool and interface for controlling and monitoring field devices. IRIS addresses some of the same features that Caltrans has come to rely on with ATMS installations in urban areas, such as increased public safety, transportation efficiency, sustainability, and the fostering of transportation management innovation. Study results showed that IRIS can dramatically lower costs compared with proprietary systems. It is estimated that the initial and ongoing system costs would be 72% lower than a proprietary system. IRIS capabilities improve safety and lower personnel maintenance needs.

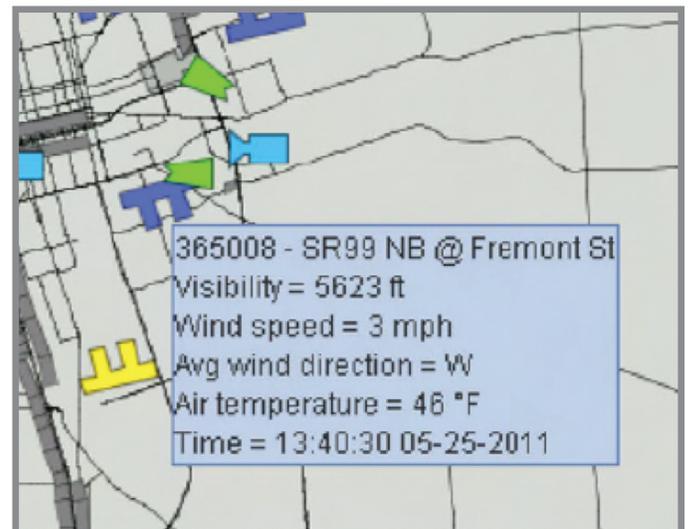
WHAT IS THE BENEFIT?

IRIS has shown to be an effective and affordable transportation management system for rural TMCs. The collaborative, open-source IRIS system has the potential of increasing the rate of transportation technology innovation for Caltrans. Access to the IRIS source code is not restricted by legal agreements, allowing other public and private transportation agencies to use and modify it. IRIS's accessibility and lower cost will increase the rate of innovation and use by Caltrans staff, researchers, students, and innovators.

LEARN MORE

To view the full report:

www.dot.ca.gov/research/researchreports/reports/2011/2011-12_task_1777-tsm.pdf



Road Weather Information System