



## System Performance Innovation FACT Sheet

### *CMS Diagnostics Module*

#### Description of the Challenge or Opportunity

##### **CMS Diagnostics Module**

##### **Understanding the motivation.**

Following the roadway tragedies of two maintenance workers in San Diego, the Supervisor of Electrical Maintenance requested the development of an application that would minimize the Maintenance Workers' exposure to live traffic while improving the process of maintaining and repairing live changeable message signs (CMS). Prior to implementation of the CMS Diagnostics Module, the Caltrans Maintenance Team would have to drive out to each individual sign and then expose themselves to the dangers of live traffic while performing their work.

Through teamwork and collaboration between the Maintenance and Traffic Systems Development Branches, the California Department of Transportation (Caltrans) has developed a remote application that minimizes their electrical maintenance workers' exposure to the dangers of live traffic, while simultaneously improving their ability to diagnose and maintain the health of Changeable Message Signs (CMS).

The "CMS Diagnostic Module" provides the ability to remotely perform very common tasks such as: the ability to obtain an overview of the CMS communication network health; the ability to send blank or "TEST" messages to the CMS; and the ability to perform sign resets and to synchronize the CMS controller time with the system time.

##### **Defining the need.**

The State of California, Department of Transportation (Caltrans) in District 12, currently maintains over 60 Changeable Message Signs (CMS) along the side of the Orange County Freeways. The CMS allow the District 12 Traffic Management Center (TMC) to provide the travelling public with valuable information such as traffic alerts and alternate routes to avoid upcoming congestion, travel times to destinations, and Amber Alerts during child abduction emergencies.

The implementation of an application that can remotely maintain the CMS signs and network has transformed maintenance work processes. Considerable travel can now be avoided, work efficiency has increased and the risks associated with working in live traffic are now significantly avoided.



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In support of Caltrans' mission, CMS Diagnostic Module helps the CMS network to remain operational, which in turn promotes the efficient operation of the freeway network, thus improving business efficiency and California's economy. This tool supports the vision and goals of Caltrans' by providing for a safer working environment through teamwork and innovation, while valuing the lives and health of the Department's people. Following the publication of an article in the November/December 2013 North America Edition of ITS International, the CMS Diagnostic Tool has gained greater visibility, which has resulted in interest being expressed by the San Diego and San Bernardino Caltrans Districts. In addition, the CMS Diagnostic Tool has been accepted by the Statewide Change Control Board as part of the Standardized ATMS

#### **Estimating the cost.**

Development of the CMS Diagnostic Module and the initial implementation has cost the Department approximately \$60,000. The cost of future implementations is estimated to be<sup>[BM1]</sup> \_\_\_\_\_.

#### **Quantifying the benefits.**

The CMS Diagnostic Module offers multiple benefits, in line with Caltrans' goals. First, providing Caltrans employees the ability to perform many CMS diagnostic and repair tasks away from live traffic provides significant risk avoidance benefits. Second, remote diagnostic and repair significantly improve the processes of maintaining the CMS network, delivering productivity benefits. Finally, the CMS Diagnostic module provides a secondary benefit of reducing department travel – in turn reducing fuel consumed and air pollution.

#### **Understanding the risks.**

As the Maintenance Staff is not located within the District 12 TMC and security considerations prevent outside access to the Advanced Transportation Management System (ATMS), the CMS diagnostics tool was, therefore, designed as a web based application that can be run from anywhere on the Caltrans internal network with due consideration for security and scope of actions that can be performed.

#### **Other considerations.**

We followed a System Engineering Process in the design, testing and implementation.

#### **About the Originating Author/Team**

This project was a cooperative effort between Caltrans District 12 Staff. The Caltrans TMC support staff works under the direction of Mort Fahrash, Chief Traffic Systems Development.