

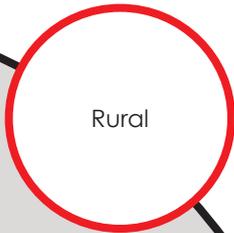


Caltrans Division of Research,
Innovation and System Information

Research



Results



Rural

SEPTEMBER 2015

Project Title:

Hand-Held Diagnostic Controller for ITS Field Maintenance

Task Number: 2328

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Task Manager:

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A Hand-Held Terminal for Field Elements

Developing applications for Changeable Message Sign and CCTV diagnostics, as well as a serial console for general device command-line interfacing

WHAT WAS THE NEED?

California Department of Transportation (Caltrans) staff must routinely configure and diagnose Intelligent Transportation System (ITS) field elements to keep the transportation system operating at peak efficiency. They use multiple tools and expensive cumbersome equipment to maintain each field element type. The vision of this research is to use a tablet-based hardware platform populated with custom applications to configure and diagnose a wide range of field element devices.

WHAT WAS OUR GOAL?

The goal of the Hand-Held Controller is to give Caltrans field personnel a more ruggedized, robust system to deal with the specific task of maintaining and configuring ITS field elements. This will enable employees to get their work done faster, safer, and with dramatically reduced chances for loss of potentially expensive equipment.

WHAT DID WE DO?

The researchers developed a suite of applications for the Hand-Held Controller and designed a portable kit to supply any needed supplemental hardware, such as cabling, to interface to the field element devices.

The Changeable Message Sign (CMS) application interfaces to the CMS controllers in the field through both network and serial interfaces. This allows for full configuration and diagnosis of the CMS system.

The CCTV applications interfaces to cameras, pan-tilt-zoom (PTZ) hardware, and video encoders in the field through both network and serial interfaces. This allows for full system configuration and diagnostics of a CCTV system. The application currently supports



DRISI provides solutions and knowledge that improves California's transportation system

camera/encoder MJPEG, MPEG4, and H.264 video protocols, and Pelco-D, Cohu, and Sony Visca PTZ control protocols.

The serial console application provides a general command-line interface for interfacing with a wide range of field element hardware.

WHAT WAS THE OUTCOME?

Due to unanticipated complexity for the system development, several key tasks were only partially completed or were not performed.

Completed Tasks:

- The hardware evaluation, requirements development and system engineering and design.
- The hardware selection, procurement and kit assembly.

Partially Completed Tasks:

- The software development for the CMS and CCTV applications were only completed through an alpha prototype and could not be adequately tested or demonstrated within the span of this research task

Tasks Not Performed:

- Demonstration of completed system
- Lab and field testing

The researchers and Division of Research, Innovation, and System Information (DRISI) have agreed to an action plan to complete the applications. Developed requirements, performed testing and updated iterations will bring the handheld terminal concept to fruition. This work will occur under a follow-up research project.

WHAT IS THE BENEFIT?

The Hand-Held Controller is highly portable and integrated. It removes the need for Caltrans staff to carry device-specific hardware or desktop test equipment or laptops to the field to configure and diagnose devices.

Because the Hand-Held Controller addresses multiple field element types, it is much more likely that Caltrans field personnel will be able to troubleshoot or configure an ITS field element as soon as they identify the need to do so, rather than needing to return to the office to retrieve device-specific tools.

Since the Hand-Held Controller is programmable and extensible, it is a tool that can be adapted for use by other state Department of Transportation agencies.

LEARN MORE

View the Final Report

<https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/final-reports/ca16-2328-finalreport-ally.pdf>

IMAGES

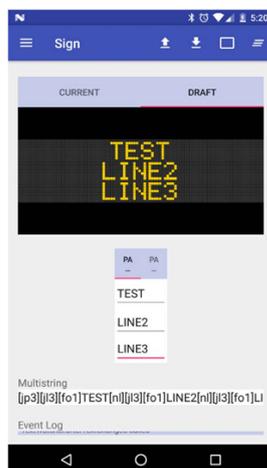


Image 1:
Changeable
Message Sign
Application



Image 2: Hand-Held
Terminal Hardware
Kit