RESEARCH NOTES

November 2006

Mobile Transportation Management Center Deployment

Why We Pursued This Research

Caltrans Division of Research and Innovation (DRI) and Cal Poly State University, with cooperation from Caltrans District 12, have developed and tested the Mobile Transportation Management Center (Mobile TMC) vehicle prototype, with the goal of adding the vehicle to the Caltrans fleet. This project was undertaken to modify and refine the Mobile TMC systems for acceptance into the Caltrans fleet.

What was done?

Cal Poly has modified the Mobile TMC to meet Caltrans vehicle standards, hardened key systems, and provided operational training to Caltrans personnel. Cal Poly has also procured and integrated an up-to-date communications link for the Mobile Ramp Meter.

Vehicle Weight: A weight analysis report for the Mobile TMC was created and utilized in the weight reduction and redistribution. The majority of the weight reduction was achieved by replacing the vehicle's roof rack with two smaller and lighter racks, removal of the auxiliary air-conditioning system, and replacement of the on-board generator with a smaller model. Equipment such as the on-board satellite communications system were replaced or modified to eliminate the need for roof access during normal operations, enabling the removal of roof safety railing and walking platforms. An alternate location for the on-board generator was found, to help lower the vehicle's center of gravity.

Vehicle Mechanical Systems: All major vehicle components including the engine, transmission, front end, front tires and wheel bearings, rear brakes, battery and battery cutout systems were all serviced and repaired as necessary. Minor body damage to the vehicle was also repaired.

Generator and Electrical Systems: The generator was replaced with a lighter unit, and the AC electrical system was brought up to code through the installation of GFI breakers, and approved by Caltrans. Alternate power methods were investigated, but found to be incompatible due to the power needs of on-board equipment.

Satellite Communications System: An alternative communications dish was selected and installed. The system provides automatic deploy, aiming, and stow capabilities from the main operator's console.

Mobile Ramp Metering Communications Link: The trailer's existing wide-area link was replaced with a Verizon link already in use by Caltrans.

Training: Cal Poly personnel provided on-site operator training to Caltrans staff. Training was hands-on, and covered setup, operations, and shutdown of both the Mobile TMC and MRM trailer.

Harden key Mobile TMC and MRM Systems: The Netgator video codec system allowing transfer of video from the Mobile TMC to the District 12 TMC was replaced with a Baxall system. Required operational interaction was reduced, and reliability increased with this replacement. The wireless link to the MRM trailer was upgraded with omni-directional antennas, reducing setup requirements for this link. All systems were evaluated and modified to make them as user-friendly as possible.

Figure 1

What can be concluded from the Research?

The work conducted under this research contract was undertaken to:

- Modify the Mobile TMC to meet Caltrans vehicle standards and gain acceptance into the Caltrans fleet.
- Evaluate operational procedures of both the Mobile TMC and MRM, and modify both platforms as necessary to simplify ease-of-use.

What do the Researchers recommend?

- PC-Integrated software solutions should be avoided wherever possible. While such solutions often appear to provide a flexible solution at a low price point, they are typically a poor substitute to their more expensive stand-alone hardware alternatives.
- All systems in a unit such as the Mobile TMC should require as little user intervention as possible, allowing operators to focus on the job at hand rather than the individual systems and components necessary to accomplish the task.
- A specification should be developed incorporating all operation requirements and lessons learned in the development and deployment of this prototype Mobile TMC, to facilitate the procurement of additional Mobile TMC units.

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Figure 2

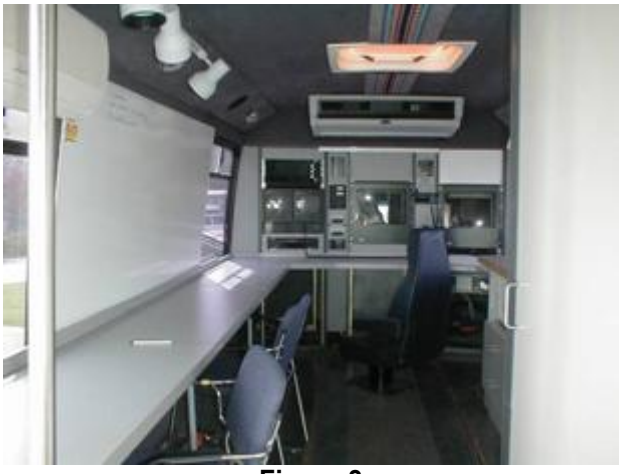

Figure 3

Figure 4