

**R  
E  
S  
E  
A  
R  
C  
H  
  
S  
U  
M  
M  
A  
R  
Y**

## ITS APPLICATIONS IN WORK ZONES TO IMPROVE TRAFFIC OPERATIONS AND PERFORMANCE MEASUREMENTS

**Problem** License Plate Recognition (LPR) technology, which uses a video-based method to capture the images of vehicles' license plates and then converts the snapshots into text-based license plate numbers, has been one of the popular approaches in Intelligent Transportation Systems (ITS) for identifying vehicles at target locations. In 2004, the University of Maryland conducted a study for the Maryland State Highway Administration (SHA) to evaluate a license plate recognition system on both a freeway (I-95) and an expressway (US-29). With the rapid development in LPR technology over the past several years, many vendors have advertised various systems with better performance, including higher capturing and recognition rates under heavy traffic congestion and at high travel speeds, better capturing capability under low visibility, and higher resolution of the captured images. The new advanced LPR technology reveals its potential for supporting the estimation of fluctuating travel times over a signalized arterial.

**Objectives** This study has the following objectives: (1) Design of a real-time LPR-based system for travel time estimation on an signalized arterial; (2) Development of a system for real-time travel time estimation and web-based information display, based on current LPR technology from a reputable vendor; (3) Evaluation of LPR technology performance under various traffic patterns at different locations on an arterial; and (4) Assessment of system reliability for use in travel time estimation.

**Description** In this study, the research team at the University of Maryland designed a LPR-based real-time travel time estimation system and deployed the system at four different sites on southbound MD201 (Kenilworth Ave.).

**Results** The evaluation results show that the LPR unit is able to capture about 65.9% of the passing traffic and correctly recognize about 72.5% of those captured plate images. The travel time estimation system was able to match license plates from 36.3% of the through traffic when most traffic volumes passed both LPR sites in the demonstration Period-1. The availability of matched license plates dropped significantly when there exists one or more major intersection and ramps between the two LPR sites.

### Report Information

This report is available from the Office of Policy and research, Maryland State Highway Administration.