OVERVIEW OF AUTOMATED ENFORCEMENT IN TRANSPORTATION

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ABSTRACT

This article provides a brief overview of automated enforcement in transportation. Automated enforcement is the use of image capture technologies to monitor or enforce traffic control laws and is seen by some public agencies as a means to combat aggressive driving behaviors such as speeding or running red lights.

The article summarizes implementation elements that were found to be important in the success of automated enforcement programs worldwide. These implementation elements include public education and awareness, involvement of the local judiciary, and the passage of enabling legislation. Examples of automated enforcement programs are provided for each element. The article also provides a discussion of several issues currently being debated, including privacy, distribution of ticket revenue, ticketing procedures, the effectiveness of automated enforcement. The authors conclude that the ultimate success of automated enforcement will not rely on the technology so much as how the technology is applied and how transportation professionals interact with state and/or local legislators, local judiciary, and most importantly the public when implementing automated enforcement.

INTRODUCTION

Recent testimony before a congressional committee highlighted the problems associated with aggressive driving, and included potential countermeasures such as increased and innovative enforcement of traffic laws (1,2). In his testimony, the administrator of the National Highway Traffic Safety Administration estimated that about one-third of all crashes and two-thirds of the resulting fatalities in the United States in recent years can be attributed to aggressive driving behaviors. Aggressive driving is often manifest in irresponsible driving behaviors such as speeding, running red lights, and tailgating. Increased enforcement of traffic laws is viewed as a potential solution for aggressive driving, but limited financial resources have led some public agencies to consider the use of automated enforcement.

For this article, automated enforcement is defined as follows:
"*Automated enforcement is the use of image capture technology to monitor and enforce traffic control laws, regulations, or restrictions. Where enabling legislation authorizes the use of automated enforcement, the image capture technology negates the need for a police officer to directly witness a traffic offense*."

For example, Figures 1 and 2 show pictures captured by an automated red light enforcement system in Howard County, Maryland. Pictures such as these are used as evidence (in addition to other testimony) to prosecute a traffic signal violation.

Background

Because of widespread interest in automated enforcement, the Institute of Transportation Engineers' (ITE's) Traffic Engineering Council developed a draft position statement on the use of automated enforcement (published in the March 1998 *ITE Journal*). A Traffic Engineering

committee, chaired by Shawn Turner, is currently gathering information on the use of automated enforcement, with an emphasis on red light, speed limit, and rail-highway grade crossing enforcement. The committee is also investigating applications of automated enforcement with high-occupancy vehicle (HOV) and bus lanes, electronic toll collection (ETC) systems, and vehicle inspection and weigh-in-motion (WIM) stations. Table 1 contains a summary of automated enforcement programs identified thus far by the committee. The committee findings will be published in an ITE Informational Report later this year.

IMPLEMENTATION ELEMENTS

Based upon a review of automated enforcement programs worldwide, several elements were found to be important in successful programs. These implementation elements include public education and awareness, involvement of local judiciary, and passage of enabling legislation.

Public Education and Awareness

Public education and awareness of automated enforcement activities is a critical element of nearly all successful automated enforcement programs. Favorable public opinion and public acceptance have been named most often as the aspect that can "make or break" an automated enforcement program. Numerous cities or jurisdictions have discontinued programs due to public or political disapproval (see Table 1).

Public safety campaigns explain why the state or local government is implementing the program, the traffic safety issues being addressed (e.g., speeding on local streets, red light violations, railroad crossing gate running, etc.), what advantages automated enforcement has over conventional law enforcement methods, and how ticket revenue will be used. These programs also inform people who receive notices by mail of their options, such as paying the fine by mail, contesting the ticket in court, or identifying another driver who committed the alleged violation. The Federal Highway Administration developed a "Red Light Running Campaign Strategic Planning Guide " to assist local agencies with public education and awareness (3). Many examples of public education materials can be found on the World Wide Web (4).

Involvement of Local Judiciary

Getting the judiciary involved early in the public debate (either before or concurrent with debate at the legislative level) is another critical but frequently overlooked step. Judges at any level have the ability to nullify automatic enforcement programs if the right case is brought to their courtrooms. Therefore, program implementors must figure out which court(s) will end up hearing contested tickets and involve those judges in the design of the program. In addition, there are several legal issues that vary among different states and municipalities, such as whether the state constitution contains an explicit or implicit right to privacy, whether the "silent witness" theory applies, and whether "service" by mail is allowed (5). Local judges can answer these questions.

Anchorage, Alaska's photo radar program was struck down at the local judicial level. The program had not been tested in the courts prior to initiation of the program (6). In New York City's successful red light running program, however, the City DOT involved administrative law judges in design of their program (7).

Passage of Enabling Legislation

Enabling legislation permits the use of automated enforcement by providing for the mailing of a ticket to a suspected violator. In most areas of the U.S. and elsewhere, explicit enabling legislation is necessary prior to initiation of an automated enforcement program. Several states' attorneys general have ruled that a combination of current laws and court rulings in effect prohibit automated enforcement (8). In addition, the public debate at the state legislature or city council level will allow prospective implementors to address the public's concerns before implementation of the system. There are several open questions concerning the implementation, such as whether photos will be taken of drivers in addition to vehicle license plates, whether the owner or the driver of the vehicle will be ticketed, whether the ticket will be a moving violation or the equivalent of a parking ticket. Public debate will allow implementors to change the system design to suit the particular concerns of their community.

In a 1995 research synthesis (9), the authors present model state legislation to allow automated enforcement programs, along with a discussion of the proposed legislation. A 1996 legal research digest (6) provides examples of proposed enabling legislation from California, Maryland, Michigan and Virginia that contain different language to reflect different choices for implementing an automated enforcement program.

There have been instances in the U.S. in which an automated enforcement program was started without enabling legislation at the state level. In 1987, the Arizona Legislature changed the penalties for driving less than 20 mph over the posted speed limit from a misdemeanor to a civil infraction. This change allowed the City Council of Paradise Valley, Arizona to pass a city ordinance permitting an automated enforcement system to detect and provide valid evidence for this type of civil infraction. Paradise Valley operated their program for 10 years without specific enabling legislation (9). Other Arizona cities, including Scottsdale, Mesa and Tempe, have also developed automated enforcement programs.

The city of Anchorage, Alaska, however, provides a more typical example. In 1996, the City of Anchorage initiated an automated enforcement program to enforce speeding. However, the city lacked statewide enforcement legislation. The program engendered public opposition because it began as a speed enforcement program for school zones, but then hours of operation were expanded to beyond school hours. Local judiciary, and later the state Supreme Court, ruled that existing state law required officers to be present at the time of the violation as a requirement of due process. The program was terminated later that year (7).

CURRENT ISSUES

The use of automated enforcement has met with opposition in some locations. The opposition has centered around a number of issues such as privacy, distribution of ticket revenue, ticketing procedures, and effectiveness of automated enforcement. These issues are introduced in the following sections.

Privacy

Legal experts have concluded that automated enforcement does not violate a citizen's legal right to privacy (6,9,9). However, most people have the perception of privacy while driving in their automobile. People feel they are giving up this perceived privacy if they drive in an area with automated enforcement. Therefore, advocates must make very clear what the public is gaining in return. A public information campaign must make clear the safety objective the program is trying to achieve, complete with data on the effectiveness of similar programs. Advocates must be sensitive to this trade-off and not dismiss the issue just because it has been shown that automated enforcement does not violate the legal definition of privacy. It may be the case in some areas that the value of perceived privacy is so strong (or the government's ability to make the case for a safety trade-off is so weak) that automated enforcement programs are defeated because of the privacy issue.

There are steps implementors can take to lessen the threat to perceived privacy. Photographing vehicles from the rear showing only the rear license plate, instead of from the front showing the front plate and driver, is less of a threat to privacy. However, not being able to identify the driver of the vehicle may require changes in the severity of penalty of citations issued by automated enforcement systems. Not mailing the photograph along with the ticket sent in the mail is another step implementors can take if privacy is a strong concern in their area.

Distribution of Ticket Revenue

Some opponents may argue that revenue generation is the primary goal of automated enforcement. For this reason, it is important to decide in the design stage for what purpose the revenue generated by the automated enforcement system will be used. Will the additional revenue be put into the city general fund? Or will it be put into a special fund to pay for transportation safety improvement measures? Either answer is acceptable, but a targeted safety fund is easier to defend. If the fines are set low enough so that the program breaks even and no revenue is generated, that fact should be included in the public education campaign.

Because the Ontario and British Columbia programs were spearheaded by the state-owned auto insurance companies, these programs are vulnerable to charges of conflict-of-interest. The increased number of moving violations issued by automated enforcement translated into higher insurance premiums for the state-owned insurance companies (7). California's "Shelley Bill", which went into effect January 1998, increased red light running tickets to $271, of which a portion is directed toward the local automated enforcement program to ensure continuing operation.

Ticketing Procedures

It is very important for implementors to decide early on who will be ticketed for a violation detected by automated enforcement systems: the driver or registered owner of the vehicle. This may depend upon provisions in state and/or local enabling legislation.

If tickets issued by an automated enforcement system are not moving violations, do not result in "points" on the alleged violator's license and are the equivalent of a parking ticket, it becomes much less important for the system to identify the driver of the vehicle. It would be impractical for the system to issue a moving violation to the registered owner of a vehicle when it could not be determined conclusively that the person actually committed the violation. Many automated enforcement programs give the registered owner the opportunity to identify the driver who committed the violation.

The New York City red light running program calls a ticket issued by their system a "Notice of Liability", which is a civil infraction or the equivalent of a parking ticket. Only the vehicle's rear license plate is photographed. Notices of Liability are issued to the registered owner of the vehicle (8). This option was more acceptable to the New York State Legislature that passed enabling legislation.

The San Francisco red light running program photographs drivers from the front and issues a moving violation to the driver of the vehicle. Photos taken by the system are compared to driver's license photographs of the vehicle's registered owner. If both photos show the same person, that person is given a moving violation that has the same severity as if a police officer had witnessed the violation and issued at ticket on the scene. A disadvantage to photo matching is that a significant number of citations may be discarded due to lack of a match or lack of clarity of the photo. In Paradise Valley, Arizona, as many as 25 percent of the tickets had to be discarded because of photographs where the driver could not be identified (9). Photo matching

may also require additional time to process and mail violation notices, although San Francisco has not had problems mailing notices within two weeks of the actual violation.

Effectiveness of Automated Enforcement

Some opponents of automated enforcement may question its overall effectiveness and it effectiveness versus other strategies. Automated enforcement of speed limits is perhaps the most debated area, since few will argue that running red lights or rail-highway grade crossings is an acceptable driving behavior. Some opponents disagree with the basic premise that speed kills (7). They assert that other factors are to be blamed in vehicle crashes and that all too often speed limits are set arbitrarily.

Other research by Bloch (10) questions the effectiveness of automated speed enforcement versus other enforcement strategies (e.g., speed display boards or periodic police patrols). Bloch claims that more than half of the 18 studies evaluating automated enforcement programs have serious methodological problems, thereby negating the validity of their positive results.

This opposition points to two considerations for agencies considering automated enforcement. First, agencies should consider a balanced 3 E's approach (engineering, education, enforcement) instead of relying solely on enforcement to fix engineering and/or education problems. Second, agencies should be extremely thorough in documenting the traffic violation problem and the effectiveness of automated enforcement in addressing this problem.

CONCLUSIONS

This article has provided a brief overview of automated enforcement in transportation. Several implementation elements that have been found in successful programs worldwide were summarized. In addition, the article presented several issues that are currently being debated among transportation professionals and opponents of automated enforcement. The numerous enforcement programs summarized in Table 1 and reviewed by the authors indicate that the technology does exist to capture images of traffic violations and prosecute violators using a mailed ticket approach. The ultimate success of automated enforcement will not rely on the technology so much as how the technology is applied and how transportation professionals interact with state and/or local legislators, local judiciary, and most importantly the public when implementing automated enforcement.

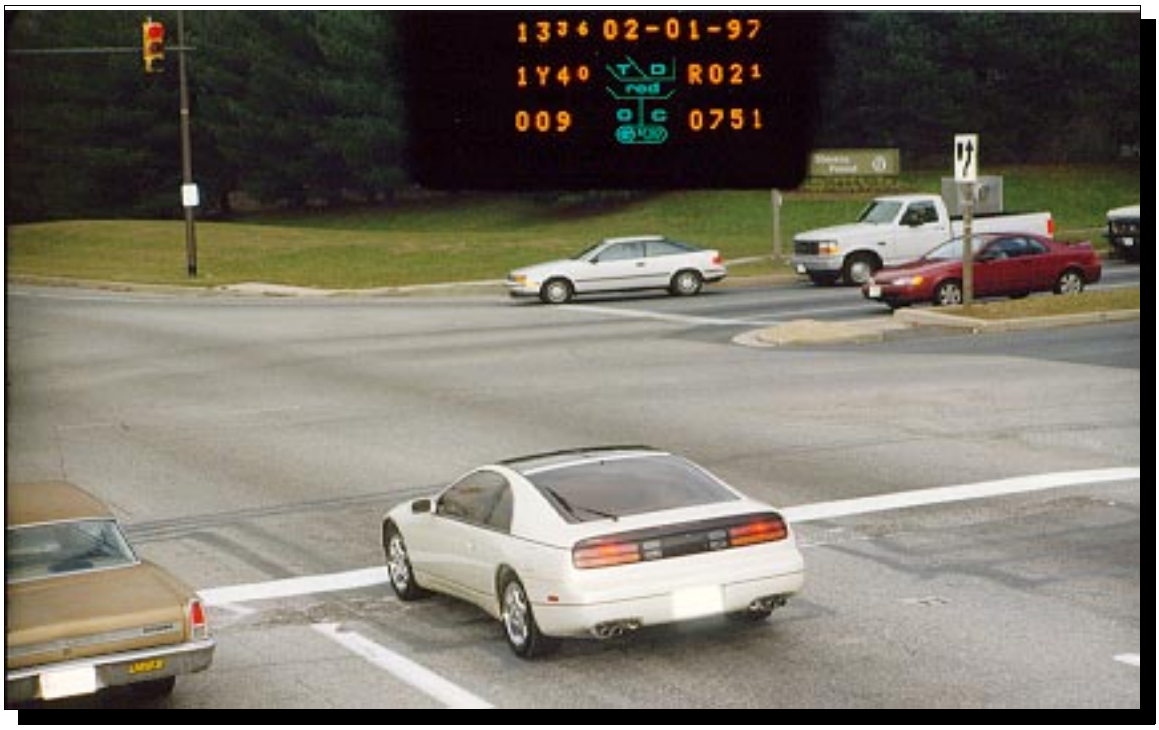

Figure 1. First Picture Taken By Automated Red Light Enforcement System
(Courtesy of Howard County Police Department)

Figure 2. Second Picture Taken By Automated Red Light Enforcement System
(Courtesy of Howard County Police Department)

Table 1. Automated Enforcement Programs Worldwide

Program Type	Programs in Operation	Test, Demonstration or Discontinued Programs
Red Light Running	Oxnard, California San Francisco, California Howard County, Maryland New York City, New York Victoria, Australia	Polk County, Florida Jackson, Michigan Lincoln, Nebraska
Speed Limit	Paradise Valley, Arizona Campbell, California Pasadena, California National City, California Riverside, California San Jose, California Garland, Utah Sandy City, Utah Wellington, Utah West Valley, Utah Washington State British Columbia Alberta, Canada Victoria, Australia Germany Norway Switzerland Finland	Anchorage, Alaska (discontinued) Peoria, Arizona (discontinued) Danville, California (discontinued) Folsom, California (discontinued) Pasadena, California (discontinued) Roseville, California (discontinued) Beaverton, Oregon Portland, Oregon Huntington, Utah Ontario, Canada (discontinued)
Railroad-Highway Grade Crossing	Jonesboro, Arkansas Los Angeles, Calfornia Ames, Iowa	Miami, Oklahoma Texas
HOV/Bus Lane	Victoria, Australia London, United Kingdon	Atlanta, Georgia Minneapolis, Minnesota Dallas, Texas
Electronic Toll Collection	More than 580 toll plazas on at least 75 separate facilities/bridges are or will soon be implemented with electronic violation enforcement systems.	
Other unique automated enforcement applications include commercial vehicles (e.g., Saf-T-Cam, New South Wales, Australia), remote emission sensing (e.g., Smog Dog in Southern California), and tailgating (e.g., Marom system in Israel).		

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