Research Project Statement

Fiscal Year: 2005  Project Statement Date: January 26, 2004

Project Number: 0-5113

Title: Improving Intersection Safety and Operations Using Advance Warning of End of Green System (AWEGS)

Developed By: TAP

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Duration (# of years):

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<th>Project Description:</th>
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| Improving safety and operations at signalized intersections having high-speed approaches is an important objective for the Texas Department of Transportation (TxDOT). To achieve this objective, TxDOT has sponsored projects to develop strategies and systems to improve dilemma zone protection and increase safety at high-speed rural signalized intersections. A project to improve safety and dilemma zone treatment by providing an Advance Warning of End of Green System (AWEGS) is concluding the initial deployment and testing using W3-4 signs and flashing beacons. Two AWEGS have been deployed in Texas, one in Waco and another in Brenham. Preliminary results in Waco have indicated a significant reduction in red-light running. Similar results are expected at the Brenham location. The initial research conducted in this project has demonstrated the benefits of providing advance warning of end of green on high-speed approaches without compromising the existing dilemma zone treatment and having minimum influence on the signal operations.

AWEGS works on the principle of predicting the operation of a traffic-actuated signal controller. AWEGS does this by monitoring all detector actuations and phase status. However, research conducted at the two locations has identified additional areas of research to improve the effectiveness of AWEGS.

First, the researchers on the initial project have observed AWEGS responding to a number of false detections. These false detections are due to three factors: 1.) Left-turning vehicles from the arterial actuating the side street left-turn detectors; 2.) Left-turning vehicles from the side street actuating the arterial left-turn detectors; and 3.) Right-turning vehicles from the side street actuating the side street detectors. As a result, these false detections are having an adverse impact on the signal operations at the intersection. While attempts have been made to minimize these false detections, minimizing them significantly was outside the scope of the initial project. Research is needed to devise strategies to minimize these false detections to improve the effectiveness of AWEGS.

Secondly, since AWEGS works on the principle of having minimum influence on the traffic signal controller, success of this system is relying on motorists observing the W3-4 signs and flashing beacons, perceiving them, and then complying with them. However, observations of the current deployments have indicated a need to conduct further research to enhance the attention value and the target value of these signs to improve their compliance and make the AWEGS more effective, particularly in locations having roadside business development.

Finally, the research proposal for the initial project did not state that dilemma zone protection for trucks would be covered explicitly. Researchers; however, have been able to distinguish trucks and the AWEGS is providing
necessary dilemma zone protection for trucks. However additional research is needed to fully understand truck needs and provide adequate protection to trucks and improve intersection safety. This proposed research would investigate strategies to significantly minimize false detections at the AWEGS systems. This research would also review the design of the W 3-4 sign layout and installation to improve the visibility, attention value, and target value of these signs. This research will also explicitly consider truck needs and provide adequate dilemma zone protection to them. These aspects will significantly enhance the effectiveness of the AWEGS system resulting in a safer intersection and wider application at other locations that warrant such systems.

| Deliverable Products And Reports: | • P1 A handbook for traffic engineers and technicians that can be used to deploy and operate AWEGS effectively.  
• R1 Research Report  
• PSR Project Summary Report |
| Implementation: | Findings from this project can be used to improve safety and signal operational issues at intersections where AWEGS is deployed. |
| Pre-proposal Meeting: | ☑ Yes ☒ No |

Sole Source Justification, if applicable:

Proposal Submission:  
• Proposals are required to be submitted in both hard copy (4 copies) and PDF format (1 PDF file per proposal). Both formats are used within TxDOT for evaluating the proposals and must contain identical information.  
• The “Background and Significance” portion of the proposal should be limited to 10 pages.  
• All proposals from researchers should be sent directly to your university’s Research Liaison for submission to RTI. The Research Liaison is TxDOT’s official contact with the university.  

Additional Information:

1. All individuals interested in proposing are encouraged to contact the PC or PD by February 12, 2004.  
2. Proposals are due to RTI by 4:00 p.m. CST on March 24, 2004.