



***Count Accuracy Assessment  
of the  
Sensys™ Wireless Vehicle Detection System  
by the  
Texas Transportation Institute***

**PERFORMANCE CHARACTERIZATION**

# **Count Accuracy Assessment of the Sensys™ Wireless Vehicle Detection System by the Texas Transportation Institute**

The Sensys™ Wireless Vehicle Detection System represents the next generation of vehicle detection technology. As a new technology, the Sensys detection system's performance has been quantitatively assessed by a number of independent studies. Many of these studies, however, have not been published in research journals and have only received limited distribution. The results of one such study conducted by researchers at the Texas Transportation Institute (TTI) of Texas A&M University are summarized here.

## **Test Conditions**

In a report dated May 2006, the Texas Transportation Institute delivered to the Maricopa Association of Governments its assessment of the accuracy of freeway vehicle detector installations at 27 different locations in the Phoenix area maintained by the Transportation Technology Group of the Arizona Department of Transportation (ADOT). In particular, vehicle count accuracy was assessed by comparing data from each of the systems to at least 120 minutes of time-stamped video of the actual traffic.

Included in the TTI study was a Sensys Wireless Vehicle Detection System installed in January 2006 by the City of Scottsdale on one of the busiest sections of freeway in the greater Phoenix metropolitan area, just south of the Shea Boulevard overpass on Arizona State Route 101, also known as Loop 101 or the Pima Freeway. Two Sensys wireless sensors are located in each of the three northbound and three southbound lanes, with the Sensys access point mounted on a luminaire pole serving Shea Boulevard. The TTI study considered just the Sensys wireless sensors located in the southbound lanes, investigating only their count accuracy.

## **Count Accuracy**

According to the TTI report, the Sensys Wireless Vehicle Detection System exhibited average count errors of 1% or less over 15-minute intervals when averaged over all lanes. Moreover, the Sensys Wireless Vehicle Detection System had the best traffic count performance of any of the inductive loop or passive acoustic detector ADOT installations that were examined: over 15-minute intervals in any individual lane, the Sensys installation often had count errors of less than 1%, even during peak traffic periods. The report notes, however, that the observed peak traffic period from 2:36 to 3:21 PM may not have included the time of day with the heaviest traffic and potentially highest traffic count error.

Time Period	Location	Lanes	Start Time	Mean Absolute Error (%)	Percent Error in Traffic Counts by Lane					
					Lane Code: A=outside (slow) ==> C, D, E, F = inside (fast or HOV)					
					A	B	C	D	E	F
<b>In-Pavement Magneto-Resistive Detector</b> (installed and maintained by the City of Scottsdale)										
[Percent error is for 15-minute traffic counts]										
Off-Peak	Loop 101 SB: S of Shea	3	12:40 PM	1%	1%	1%	0%			
Off-Peak	Loop 101 SB: S of Shea	3	12:55 PM	1%	1%	-3%	0%			
Off-Peak	Loop 101 SB: S of Shea	3	1:10 PM	1%	1%	2%	-2%			
Off-Peak	Loop 101 SB: S of Shea	3	1:25 PM	1%	1%	-2%	1%			
Peak	Loop 101 SB: S of Shea	3	2:36 PM	0%	0%	0%	0%			
Peak	Loop 101 SB: S of Shea	3	2:51 PM	0%	0%	0%	0%			
Peak	Loop 101 SB: S of Shea	3	3:06 PM	1%	0%	1%	0%			

source: Texas Transportation Institute, "Final Report on Accuracy Evaluation of Arizona DOT Freeway Management System Detectors," May 2006

**Sensys count errors over 15 minutes never exceeded 3% in any single lane,  
better performance than any of the other tested inductive loops and passive acoustic detectors**

## ***Conclusion***

The TTI study was intended as an accuracy audit of a sample of the inductive loops and passive acoustic detectors used in the Maricopa Association of Governments and ADOT regional traffic counting systems. At the request of the Maricopa Association of Governments, count accuracy of the Scottsdale installation of the Sensys Wireless Vehicle Detection System was additionally investigated as part of the study. The TTI report concludes that “while loop detectors had accuracy levels that are consistent with typical loop detector accuracy, [the Sensys Wireless Vehicle Detection System provides] “traffic counting accuracy comparable to or better than loop detectors.”

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For more information about advanced Sensys technology from Sensys Networks, please visit [www.SensysNetworks.com](http://www.SensysNetworks.com) or contact [info@SensysNetworks.com](mailto:info@SensysNetworks.com)

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