

Investigation of vehicles as probes using global positioning system and cellular phone tracking: field operational test.

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Abstract

This paper reports on the first phase of the location technology evaluation for probe vehicles. Two technologies were evaluated, Global Positioning Systems (GPS) and the cellular phone tracking technology developed by US Wireless. Although GPS has shown great potential for vehicle probes, much of the previous research is theoretical in nature. Very little work has been done in the areas of experimental research, implementation or deployment. Most of the field tests were anecdotal; a systematic approach is highly desired to develop a vehicle probe system that is reliable and efficient for traffic management. If GPS is widely deployed in cellular phones, as GTE in 1998 predicted would happen, GPS technology will become even more attractive and realistic for vehicle probe activities. A custom software package was developed as part of this project in order to conduct the technology evaluation. The software, the Travel Information Probe System (TIPS) maps positions of probes of arbitrary accuracy to an embedded Geographical Information System (GIS) in order to determine the path the probe took. Once the path has been determined, the software calculates the travel time for each road segment traversed. The preliminary analysis of two Bay Area counties showed that accurate location technologies are capable of producing travel time information for nearly all roads. A technology with 20-meter accuracy can produce data for 99.2% of road segments and 98.9% of the freeway segments in the two counties studied.

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