INTRODUCTION

Many transportation agencies use re-identification technologies to identify multiple vehicles along the roadway as a way to measure travel times and congestion. Recent advancements have allowed for the detection of unique media access control (MAC) addresses from Wi-Fi and wireless local area network (WLAN) enabled devices. This study represents the first attempt to measure the fundamental characteristics of Wi-Fi re-identification technology as it applies to transportation data collection.

FIELD TESTING

Wi-Fi sensors were placed at five intersections along a 5-mile (8km) section of U.S. 50 in Northern Virginia. Bluetooth sensors were collocated for comparison.

More MAC addresses were recorded by Wi-Fi sensors than by Bluetooth sensors at a single location. Wi-Fi devices were less likely to be re-identified when passing multiple detectors.

CONCLUSIONS

- Wi-Fi devices were sampled at higher rates than Bluetooth devices.
- Wi-Fi devices are less likely to be re-identified than Bluetooth devices. The higher number of Wi-Fi devices negates this shortcoming when tracking over two sensors.
- To improve the probability of discovery, Wi-Fi sensors should be positioned in areas that allow vehicles to slow or stop.
- Bluetooth sensors may generate more samples for applications that require tracking vehicles over three or more consecutive sensors.