



To: I-95 VPP Users
From: VPP Project Team
Subject: **Use of Wi-Fi and Bluetooth for reference travel time for validation**
Date: May 30, 2017

The I-95 Corridor Coalition's Vehicle Probe Project (VPP) validation program has evolved over time to adapt and take advantage of new technologies. As such, the validation program now utilizes both Bluetooth and Wi-Fi signals to collect reference travel time data for the validation program. Bluetooth travel time data has been well established, with detection rates (also called match-pair rates or penetration rates) of 3-5% of through traffic. In recent years with the proliferation of Wi-Fi in vehicles and on mobile devices, Wi-Fi signals have begun to be used for traffic re-identification to obtain travel times. The basic premise for obtaining travel times from Wi-Fi is similar to that of Bluetooth. Bluetooth and Wi-Fi traffic data technology now goes by the term 're-identification' technologies. The communication protocol for Wi-Fi signals creates different detection properties. Wi-Fi matched pair rates are variable whereas Bluetooth matched pair rates are relatively constant. As a general rule, for low-speed applications such as arterial data collection, Wi-Fi can provide significantly more detections, increasing the confidence of the travel time estimates. As the speed of traffic increases to that of highway speeds, the detection rate of Wi-Fi degrades such that it is equal to or less than Bluetooth. The Bluetooth detection rates remains relatively constant, independent of traffic speed.

In addition to using both Bluetooth and Wi-Fi, also note that the University of Maryland's validation team has transitioned from owning its own data collection equipment (20 first generation Bluetooth sensors) to contracting for data collection services. The contractor uses a combination of Bluetooth and Wi-Fi, based on what is most appropriate for the data collection environment. A technical memo regarding the effectiveness of Bluetooth versus Wi-Fi dating to 2015 is attached to provide additional insight. The data from this technical memo was obtained through the Coalition's validation exercises in Northern Virginia in 2015. The University of Maryland continues to monitor the technology advancements with respect to re-identification data (Bluetooth and Wi-Fi data collection) and adjusts its reference travel time data collection accordingly to leverage advancements and minimize cost. Should you have any questions, please contact Denise Markow, P.E. at DMarkow@i95coalition.org or 301.789.9088.