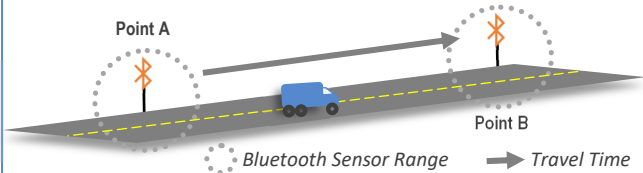


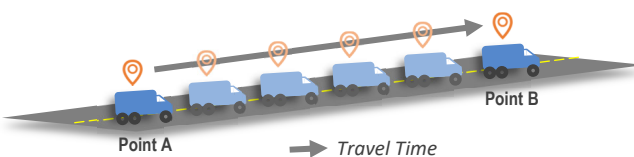
BLUETOOTH

- Requirements:**
- ▶ Sensors in the field
 - ▶ Data must be purchased from third party
 - ▶ Bluetooth/Wi-Fi must be activated
- Benefits:**
- ▶ Higher penetration rate
 - ▶ Can be installed for specific projects
 - ▶ Collects travel time & origin-destination
- Description:**
- ▶ Data is collected at Point A and Point B only
- Limitations:**
- ▶ Cannot measure volume
 - ▶ Travel time updates lag behind real-time
 - ▶ Parallel corridors are hard to differentiate (I-15 and frontage roads)



PROBE

- Requirements:**
- ▶ Vehicle navigation system or app activated
 - ▶ Data must be purchased from third party
- Benefits:**
- ▶ Does not require field equipment
 - ▶ Collects speed and travel times
- Description:**
- ▶ Data is collected at multiple points along vehicle path
- Limitations:**
- ▶ Lower penetration rate
 - ▶ Cannot measure volume or determine origin/destination
 - ▶ Travel times are unreliable for low volume roads and mountainous geography



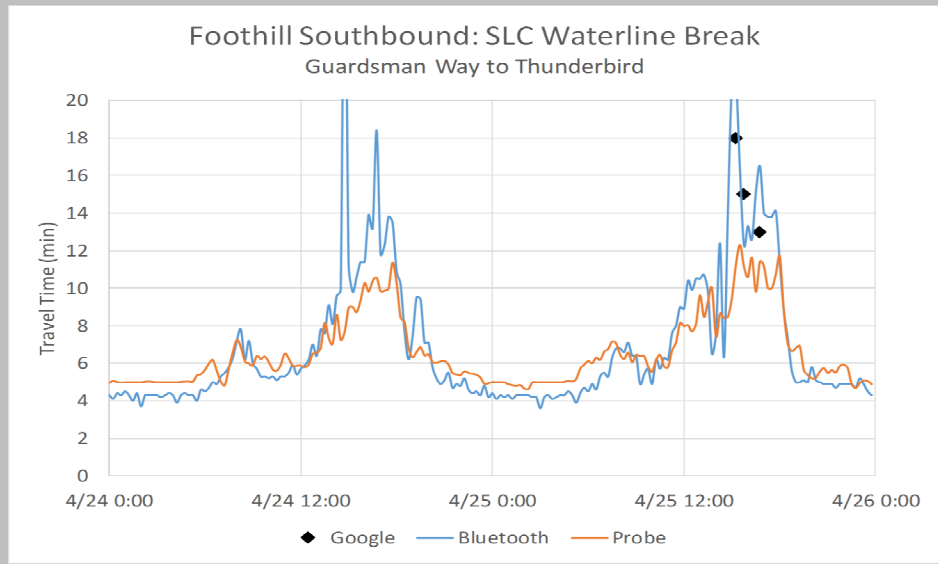
POINT

- Requirements:**
- ▶ Radar or loop equipment in the field
- Benefits:**
- ▶ Collects volumes and speed
 - ▶ Data does not need to be purchased from third party
- Description:**
- ▶ Data is collected at equipment location
 - ▶ Available on major highways in urbanized areas
- Limitations:**
- ▶ Can only collect data at equipment locations
 - ▶ Can not collect travel times or origin-destination



Example of Google, Bluetooth, and Probe data for the same route

- ⇒ Probe travel time may be less reliable with fewer samples
- ⇒ Bluetooth may collect data for adjacent routes



Applications	Bluetooth	Probe	Point
Advocate for Funding		●	●
Evaluate Project Improvements		●	●
Manage Traffic During Construction	●	●	
Describe Events and Incidents		●	
Traffic Forecasting (Video Recording)		●	●
Identify Choke Points		●	●
Identify Construction Windows			●
Origin/Destination	●		
Provide Alerts During Construction	●	○	
Executive Speed Reports		●	●
Historical Data for Corridors		●	●
Special/Short Term Deployment	●		
VMS Display Travel Times	●	○	



2019 HERE Data Validation Study performed by RSG: 95% of routes studied were not significantly different from Google data.

Sample Size Comparison

- Bluetooth 20-40% of vehicles
- Point 100% of vehicles
- Probe 2-15% of vehicles