



Visualization and Assessment of Arterial Progression Quality Using High Resolution Signal Event Data and Measured Travel Time

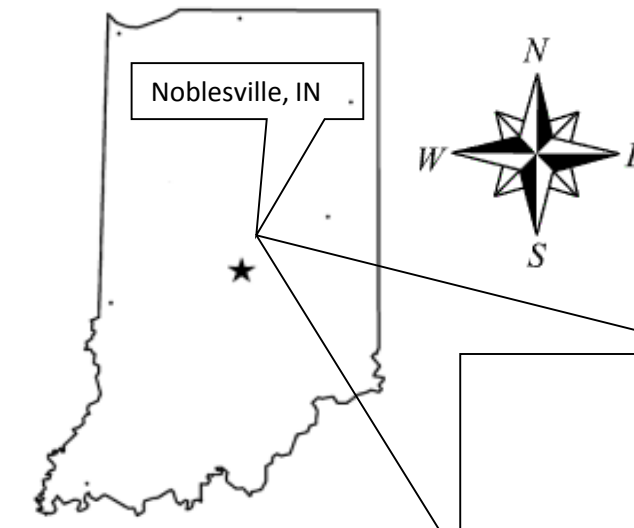
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1: Purdue University; 2: Indiana Department of Transportation

Objective

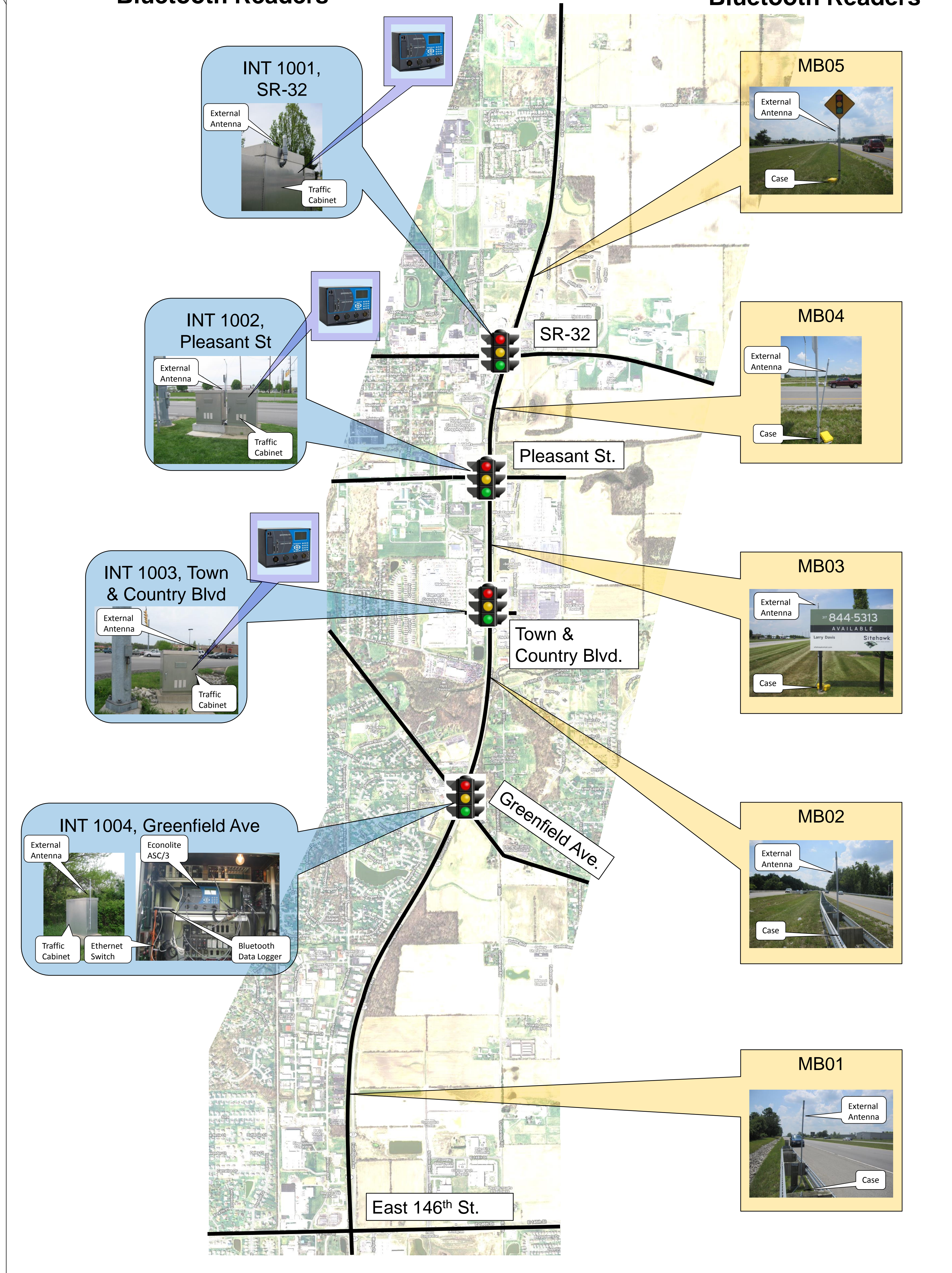
Instrument a four intersection corridor with both high resolution traffic signal controller data loggers and probe vehicle travel time measurement to actively manage the signalized corridor.



Instrumented Corridor

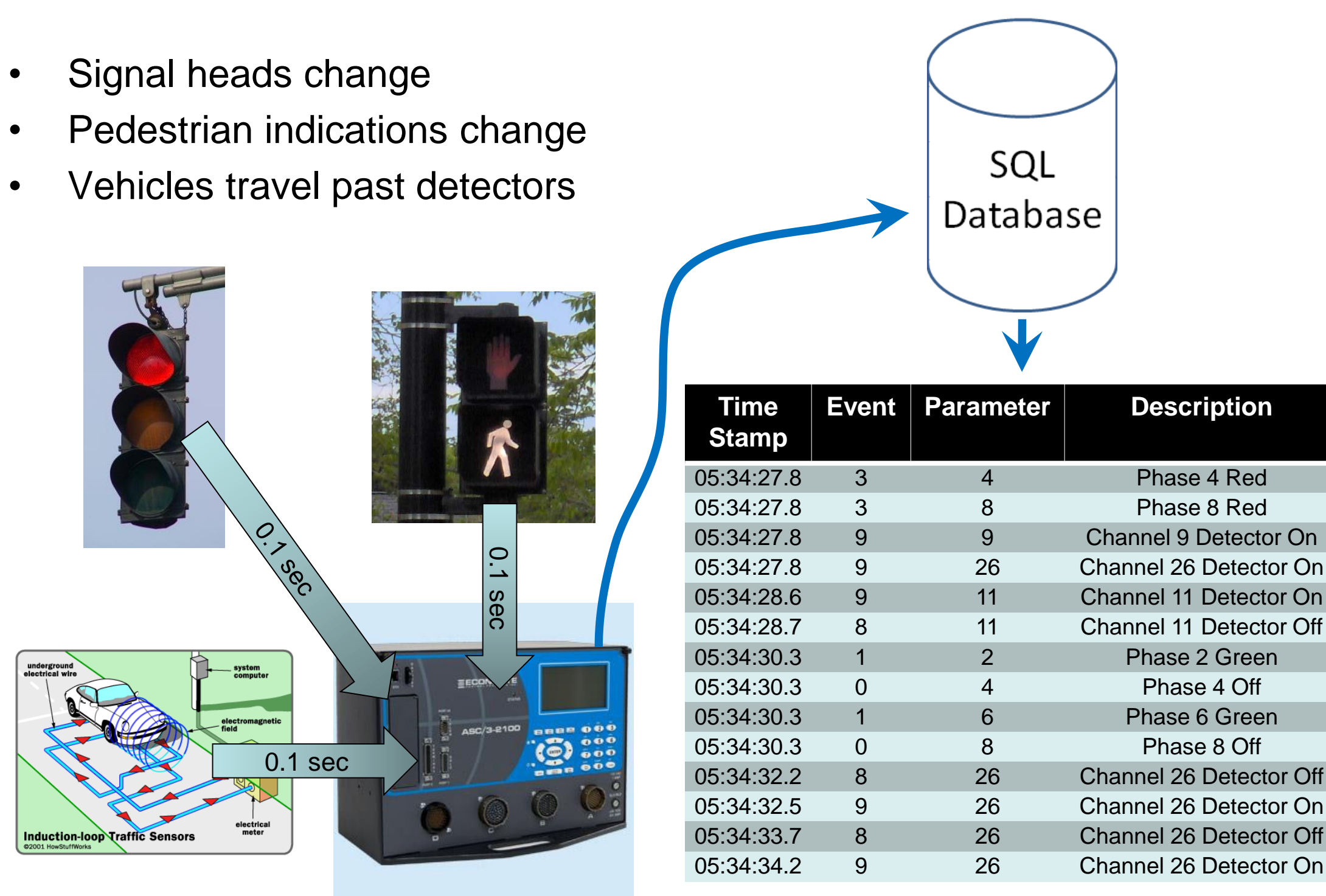
Cabinet (Node) Mounted Bluetooth Readers

Midblock (Link) Mounted Bluetooth Readers



High Resolution Traffic Signal Controller Event Data

- Signal heads change
- Pedestrian indications change
- Vehicles travel past detectors



Tracking Travel Time Through Bluetooth MAC Addresses

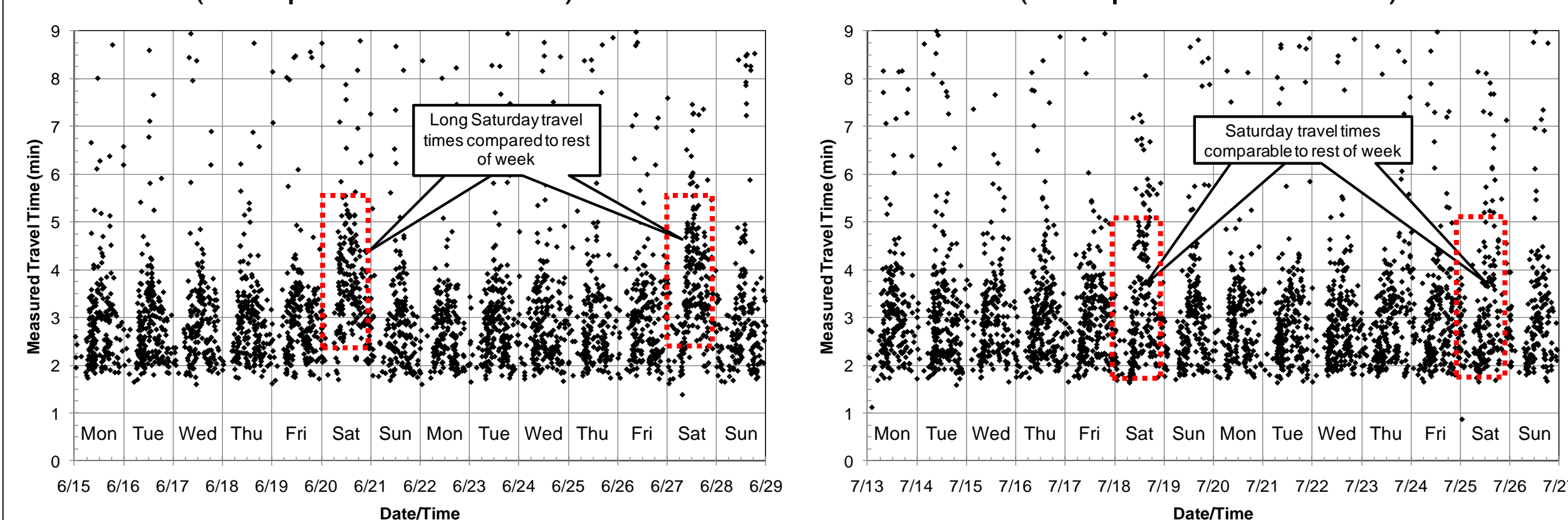
Bluetooth is a wireless protocol used by many small devices including cell phones and laptops. Every transceiver has a unique 48-bit Media Access Control (MAC) Address. These MAC addresses can be matched in the same manner as license plate surveys.



Recorded Travel Time Through Corridor Before and After Adjustments

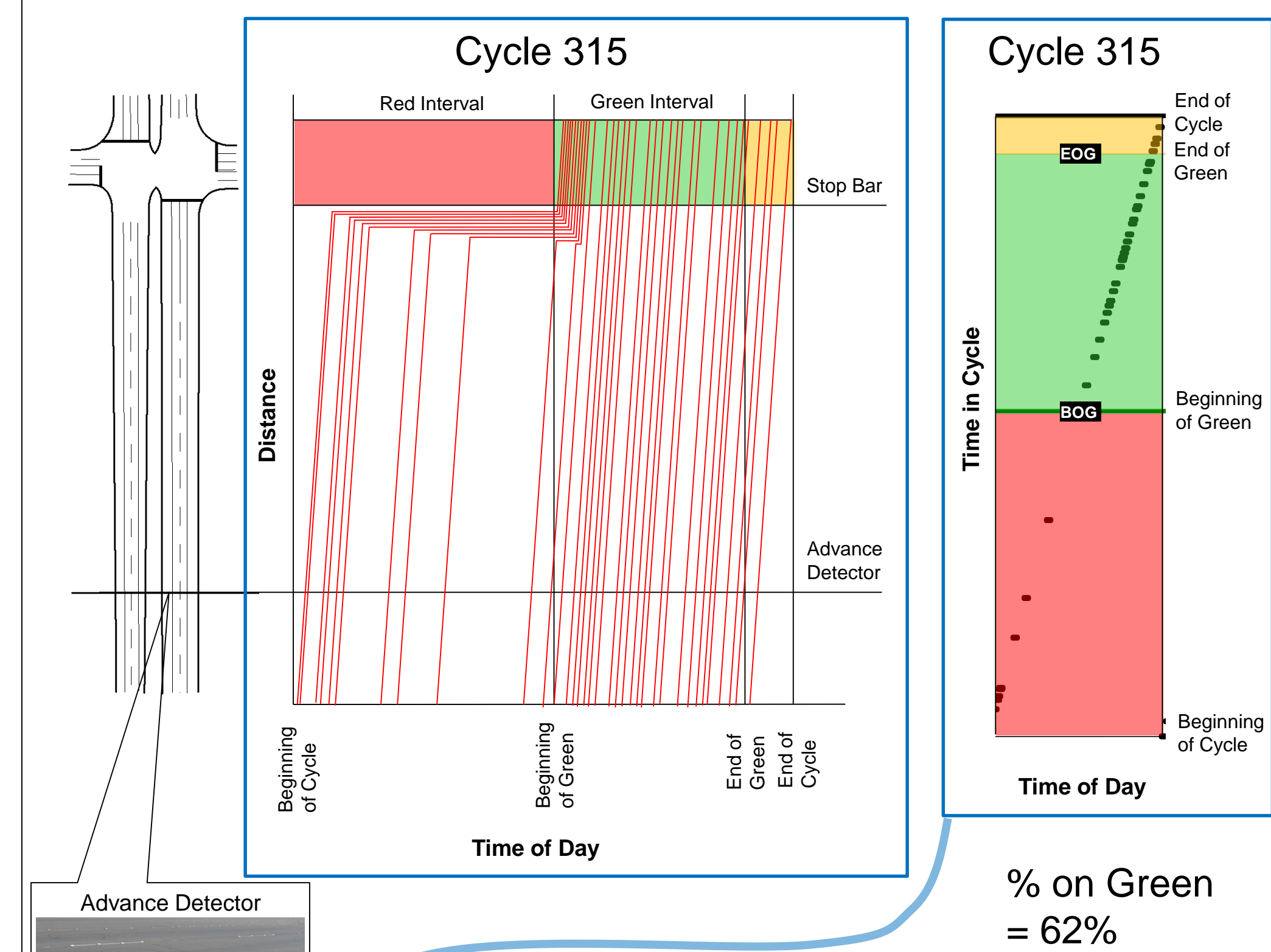
Northbound Travel Time Before (Sample Size = 4797)

Northbound Travel Time After (Sample Size = 5401)

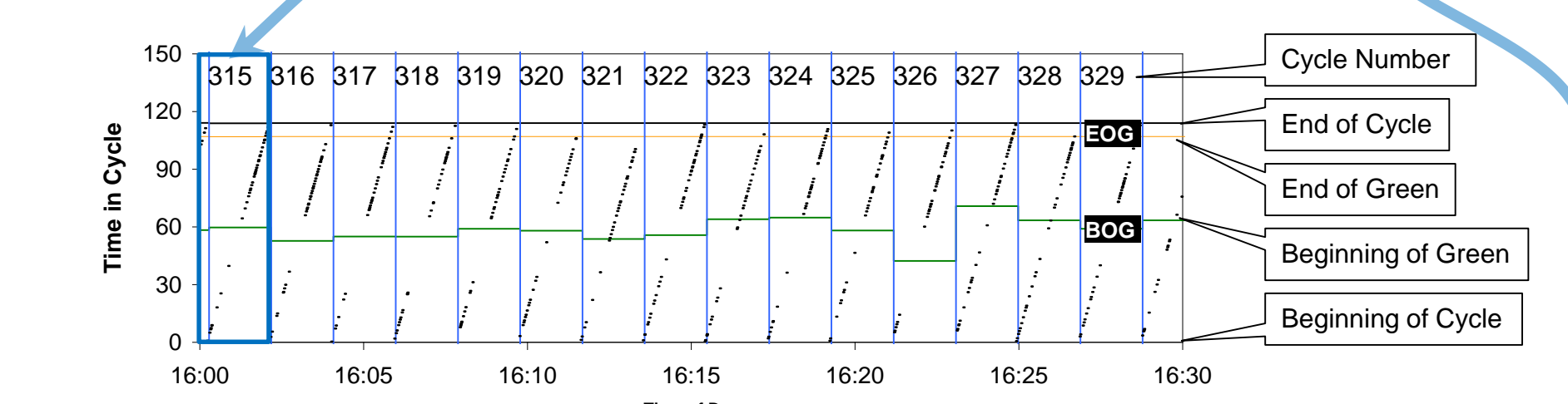


The Purdue Coordination Diagram (PCD)

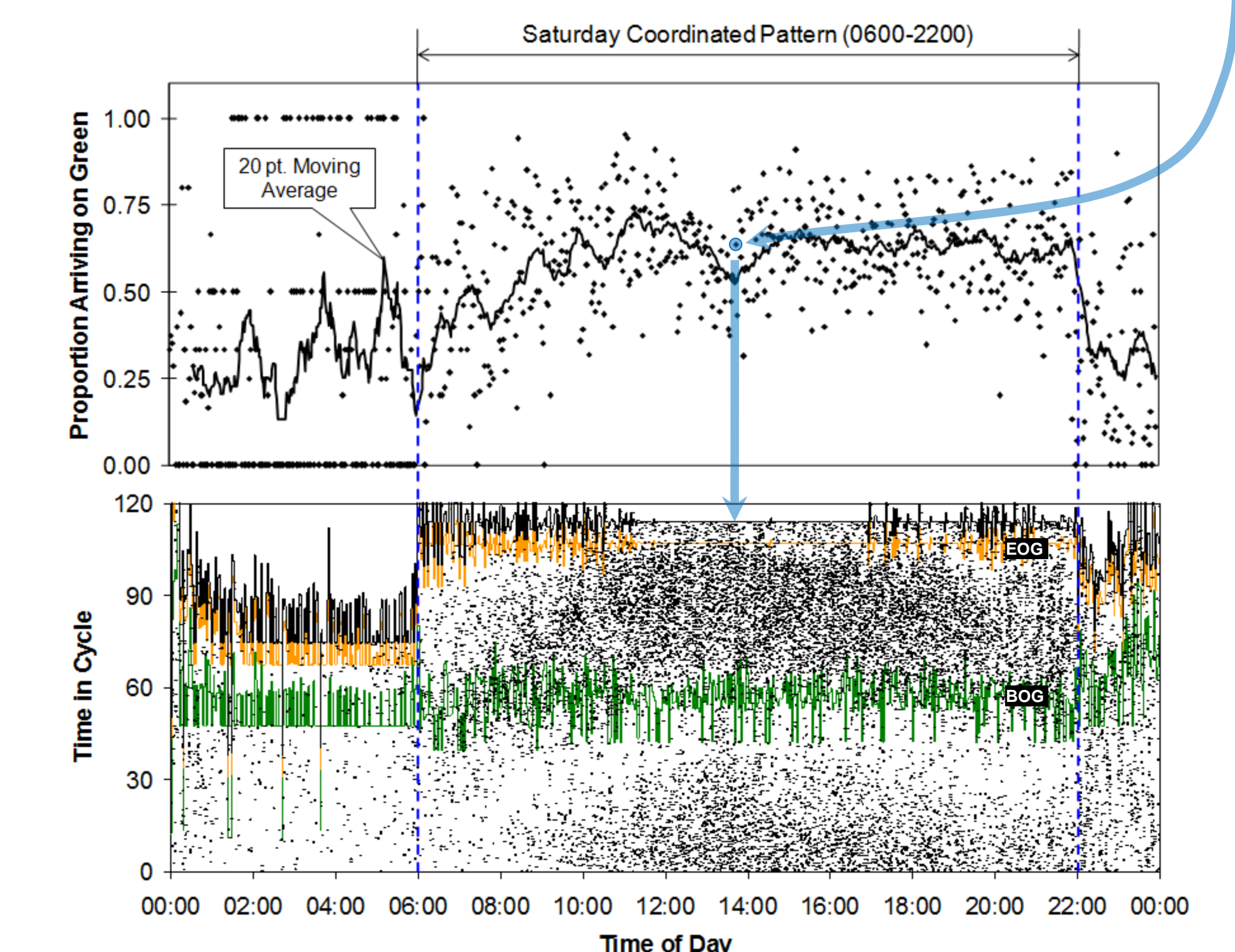
a) Plotting vehicle arrivals by both time in cycle and time of day



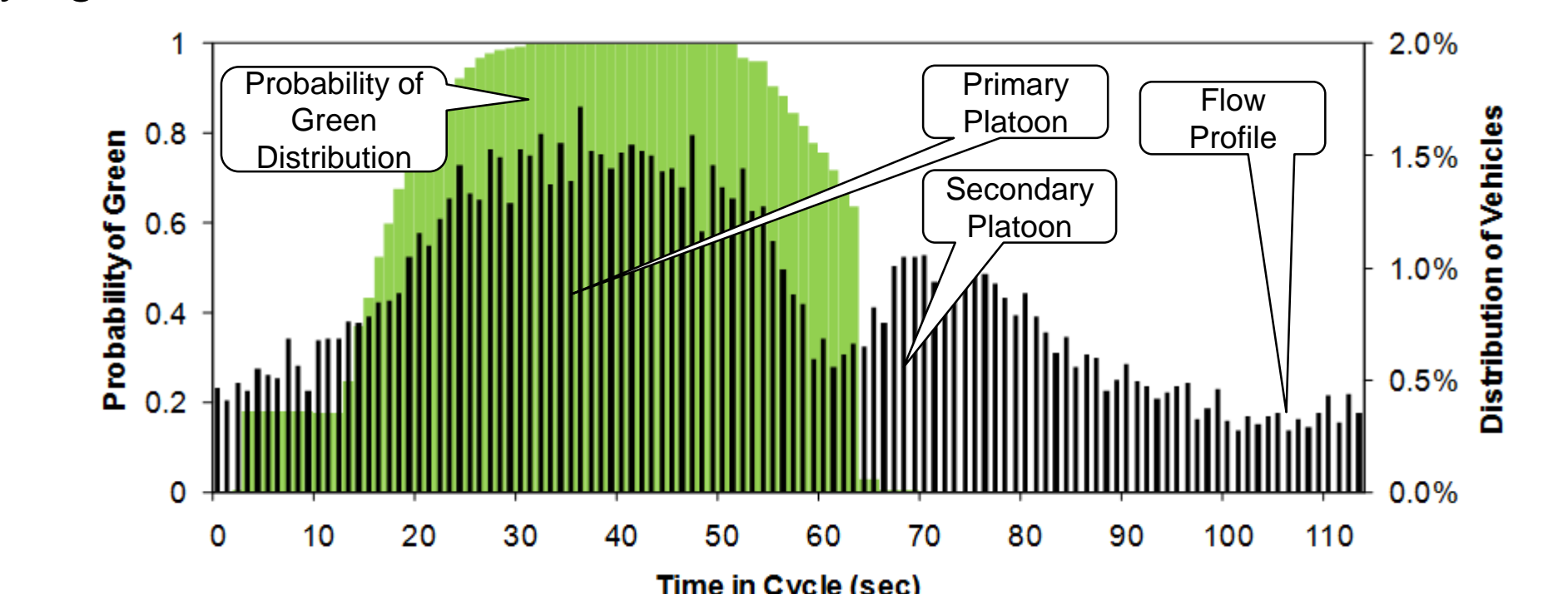
b) Plot of 14 cycles over 30 minutes



c) Twenty four hour PCD & percent on green plots

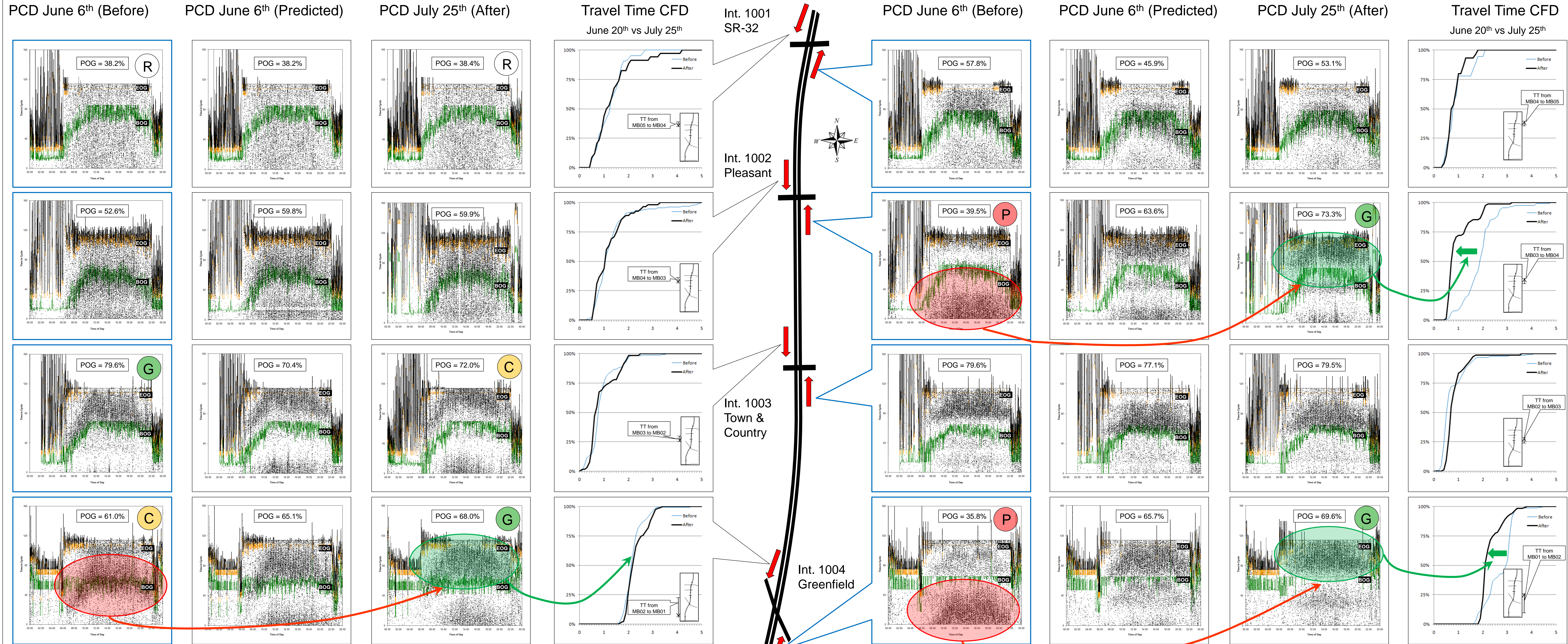


The PCD is an extension of the platoon profile diagram developed in the 1960's, but with an added time of day dimension to visualize time varying characteristics of traffic.

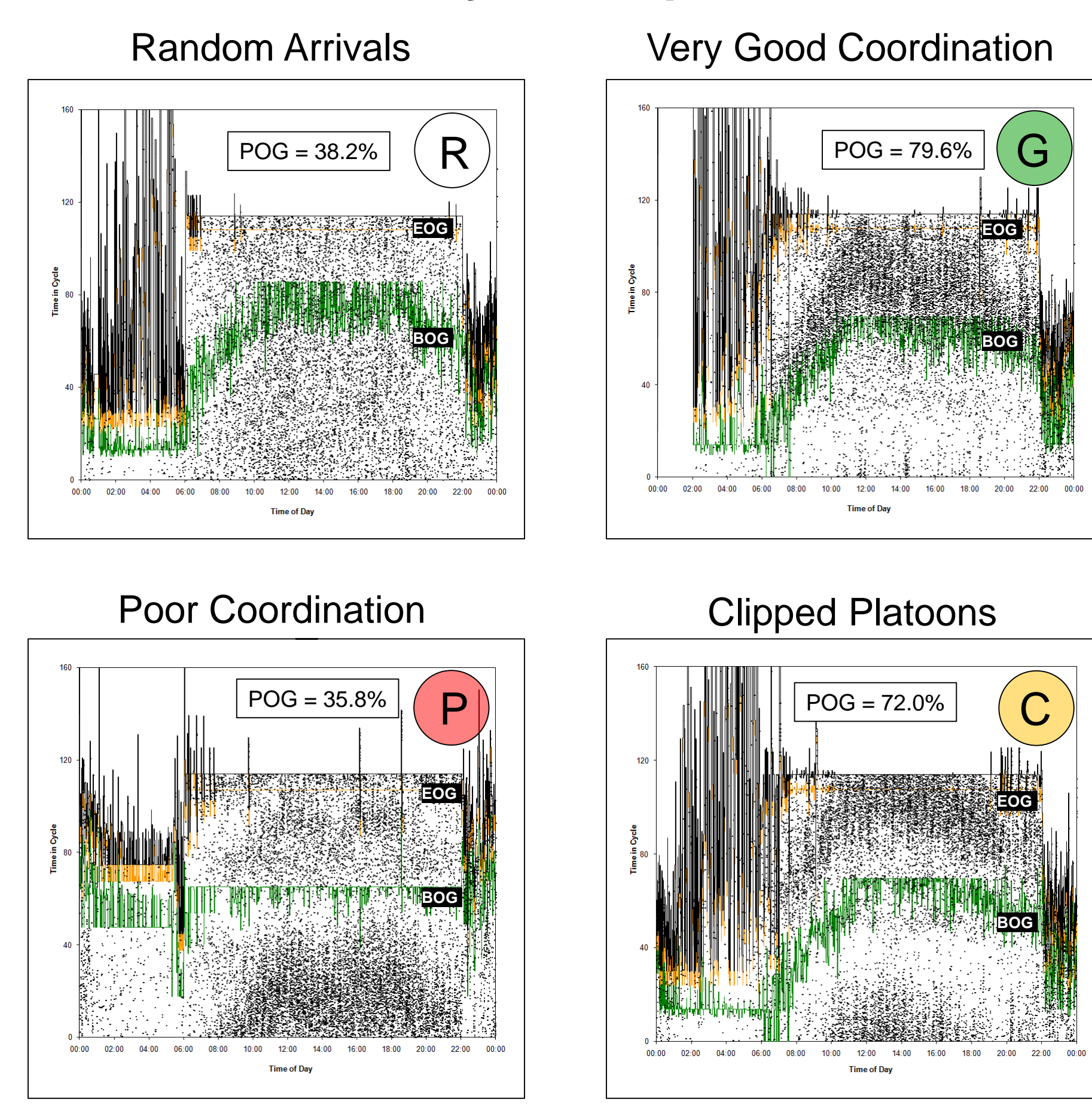


Visualization and Assessment of Arterial Progression Quality Using High Resolution Signal Event Data and Measured Travel Time

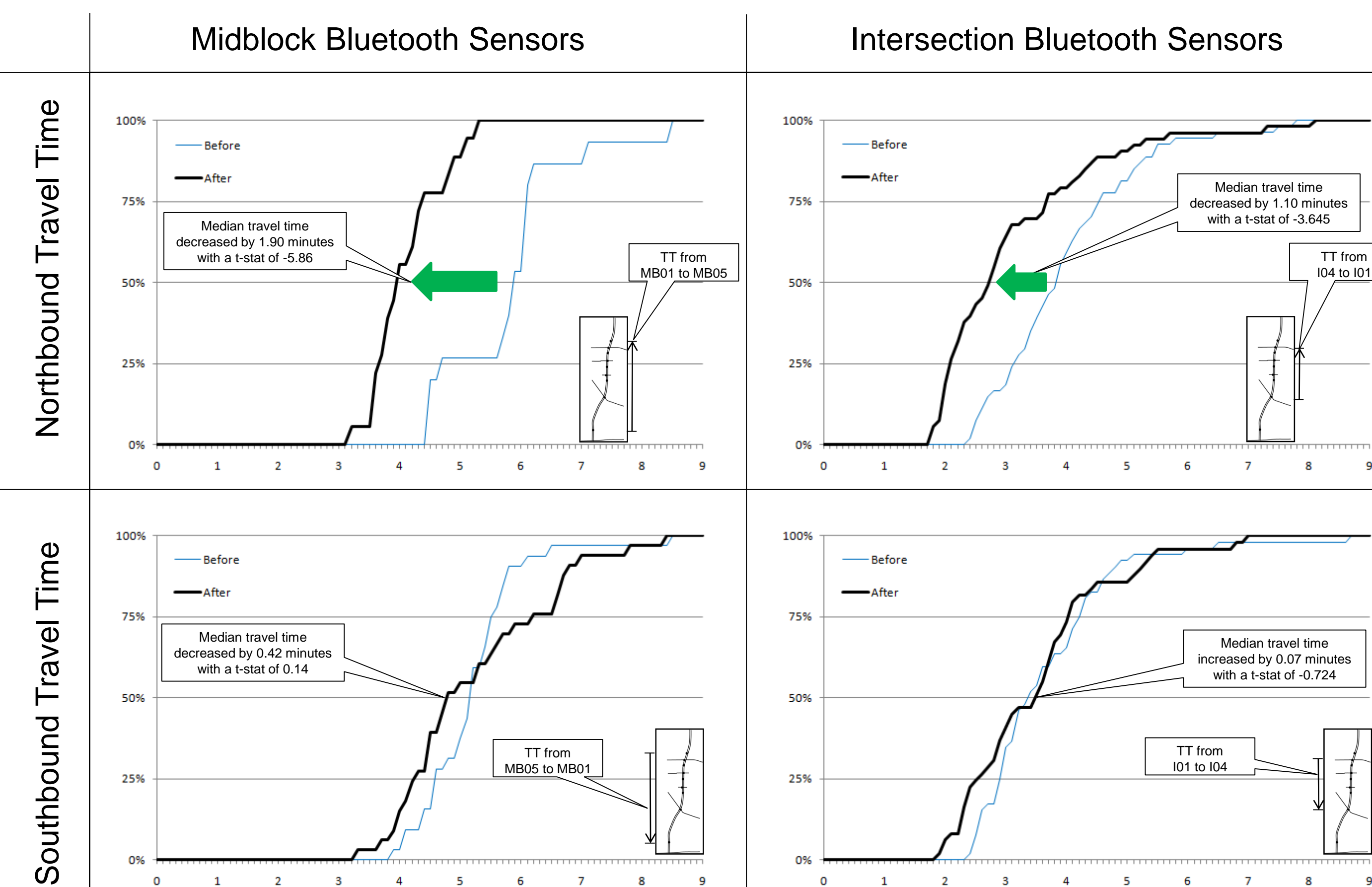
Adjusting Intersection Cycle Offsets with PCDs



Key Concepts



Travel Time Through Corridor Before and After



Conclusions

- Vehicle data showed a clear travel time problem on Saturdays
- The high resolution controller data was leveraged to create PCDs to identify problem intersections
- The PCDs were used to estimate offset adjustments to address the problems
- The probe vehicle data was used to assess the outcome of the new timings

Intersection	Offset Before (sec)	Offset After (sec)
1001	0	0
1002	62	44
1003	74	34
1004	29	89

- Although midblock travel time instrumentation is the most desirable, the intersection based instrumentation is more practical for long term deployments due to availability of power and communication.