MARYLAND DEPARTMENT OF TRANSPORTATION

Smart Signals

Presentation to the BRTB on July 25, 2017

What is a Smart Signal?

- Official announcement from Governor and Secretary soon.
  - Adaptive
  - ATMS
  - CV/AV
  - Performance Monitoring
  - Ramp Metering

MARYLAND DEPARTMENT OF TRANSPORTATION

Adaptive

- 36 adaptive signals in 4 systems
- US 1 Elkridge since October 2015
  - Centracs Adaptive – split and offset only
  - Measured mainline and key side streets
  - 3 % reduction in travel time
- MD 24 Bel Air - 2016
  - Centracs Adaptive
  - Measured mainline only
  - >10 percent reduction in travel times during some periods

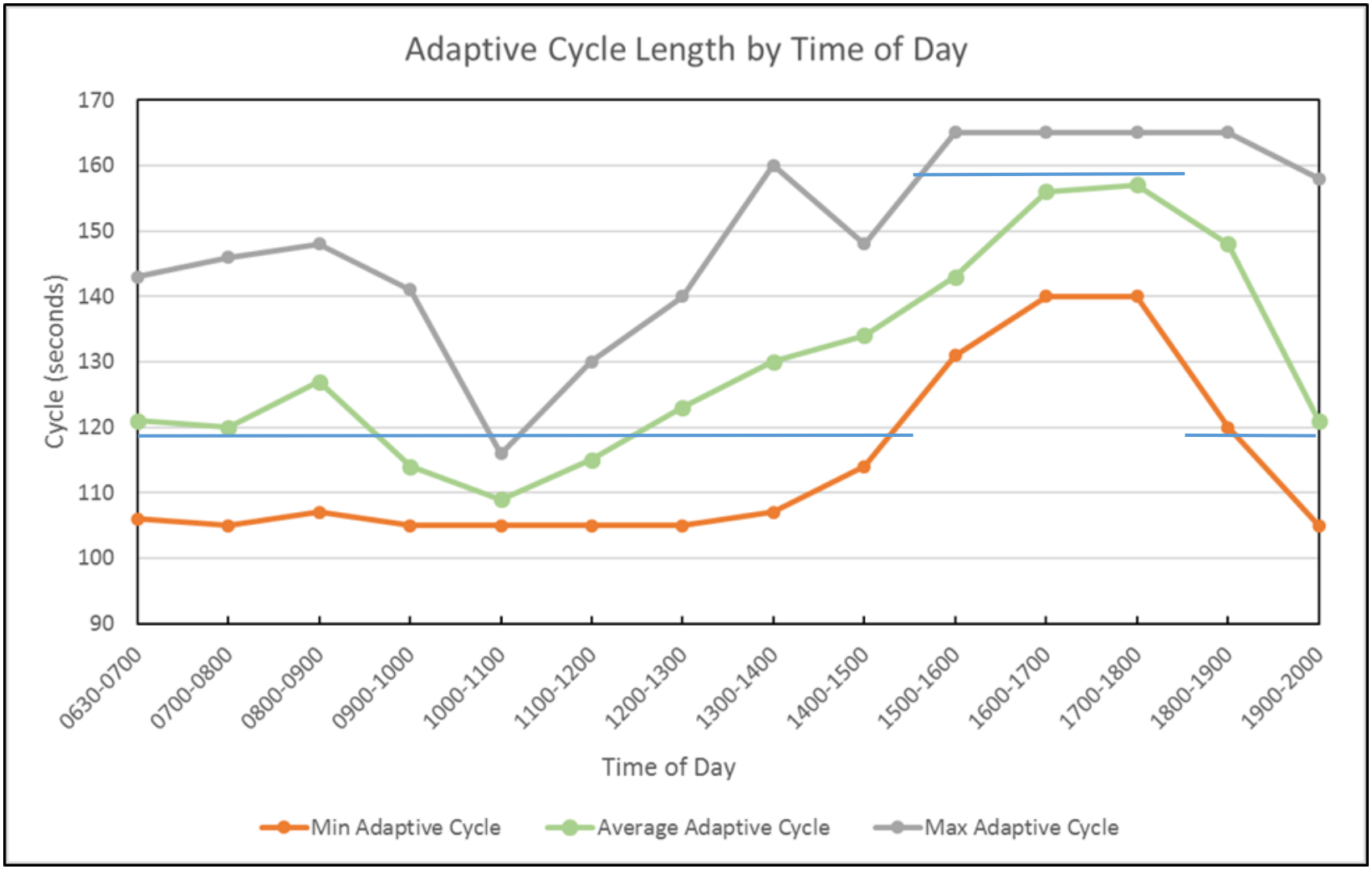
MARYLAND DEPARTMENT OF TRANSPORTATION

Adaptive

- MD 2 Brooklyn Park
  - 4 signals operating Synchro Green(Naztec) since April
    - Adaptive cycle
  - Before/after study nearly complete
    - TM counts + Hourly split/cycle reports → Infer side street delay
    - GPS Travel time runs for mainline delay
    - Changed cycles frequently
    - No complaints about side streets

MARYLAND DEPARTMENT OF TRANSPORTATION

Adaptive


Adaptive Cycle Length by Time of Day
Cycle (seconds)
170
160
150
140
130
120
110
100
90
0630-0700
0700-0800
0800-0900
0900-1000
1000-1100
1100-1200
1200-1300
1300-1400
1400-1500
1500-1600
1600-1700
1700-1800
1800-1900
1900-2000
Time of Day
Min Adaptive Cycle
Average Adaptive Cycle
Max Adaptive Cycle

Adaptive

- Underway
  - MD 139 Towson (3) – Activated July
  - US 301 Bowie (6) – Programming nearly complete
- Another 50+ intersections in FY 2018
  - Adaptive priority list

MARYLAND DEPARTMENT OF TRANSPORTATION

Adaptive

- Challenges in operating
  - Need to check regularly and keep communications running
  - Portions of US 1 and MD 24 down due to construction or equipment failures
  - Need to reprogram for added, removed, or rebuilt signals
- Training
  - Program small systems in-house
  - May have to learn 2 ATMS and adaptive systems (Econolite and Naztec)

MARYLAND DEPARTMENT OF TRANSPORTATION

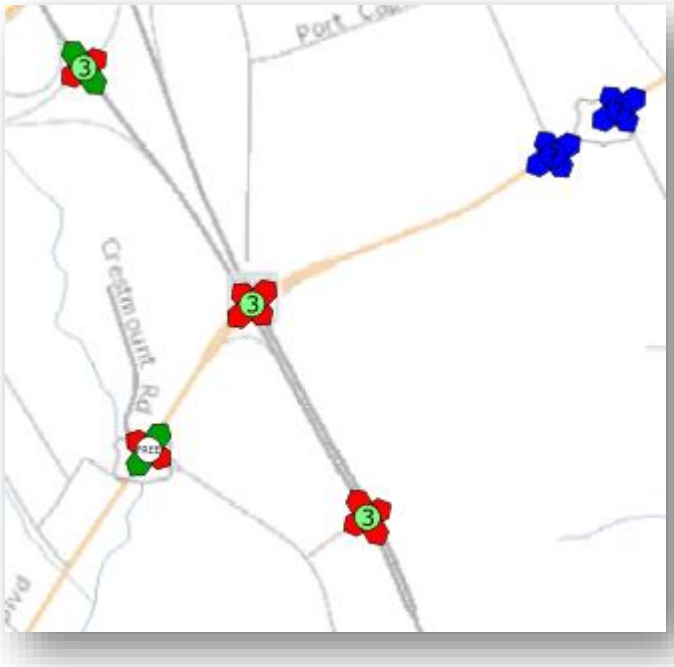
Performance Monitoring

- Current Measures
  - Traditionally delay (through models) and travel time
  - ATMS adds more tools - delay, Perdue Reports, travel time, percent arrival on green, cycle failures…
- Consider goals for the corridor
  - Safety
  - Pedestrian accessibility
  - Multi-modal
- Goals becoming more individual and qualitative

MARYLAND DEPARTMENT OF TRANSPORTATION

ATMS

- Currently 99 signals in Centracs
  - 74 at last BRTB Traffic Signal Subc meeting
  - Targeting adaptive priorities
  - Systems without communication
  - High profile corridors
- Enhanced monitoring
  - Signal status at a glance
  - Split reports
- Still working on:
  - Video
  - TM counts
  - Integrated travel time



MARYLAND DEPARTMENT OF TRANSPORTATION

CV/AV

- Secretary wants Maryland to be a leader in supporting CV/AV development
  - US 1 between MD 32 and I-195 has been identified as a demonstration corridor.
  - Testing 12 CV/AV-ready Cobalt controllers on MD 2
- Challenges
  - Vehicle data backhaul can't be supported with 4G
  - Looped fiber for redundancy
  - Institutional – OOTS, CHART, IT

MARYLAND DEPARTMENT OF TRANSPORTATION

Ramp Metering

- I-270 Innovative Congestion Management
- FHWA Ramp Metering Workshop
  - Significant physical improvements – ramp storage/widening
  - Limit arterial impacts
  - Adaptive
  - Case studies – Portland, Minneapolis, Atlanta, Sydney
- TBD
  - Who monitors and operates
  - Hardware and algorithm

MARYLAND DEPARTMENT OF TRANSPORTATION