TRAFFIC RESPONSIVE SIGNAL COORDINATION IN SACRAMENTO COUNTY
WHO IS “BILL CROWL”?  
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Associate Transportation Engineer  
Sacramento County Department of Transportation (SACDOT)  
Assigned to the Sacramento County Traffic Operations Center  
BS Applied Science & Technology – Emphasis in Aviation  
California Registered Professional Engineer - Electrical  
California Registered Professional Traffic Engineer
TRAFFIC RESPONSIVE COORDINATED CORRIDORS (24X7)

Arden – 1 section – 5 signals – 9 patterns
Bradshaw – 1 section – 5 signals – 2 patterns
Calvine – 1 section – 6 signals – 9 patterns
Elk Grove Florin – 1 section – 4 signals – 9 patterns
Fair Oaks – 1 section – 11 signals – 15 patterns
Florin – 1 section – 10 signals – 6 patterns
Fulton – 1 section – 4 signals – 15 patterns
Hazel – 1 section – 7 signals – 5 patterns
Howe – 1 section – 9 signals – 9 patterns
Watt – 4 sections – 33 signals – 25 patterns
SOME DEFINITIONS

• TRAFFIC ACTUATED (Behavior Accommodating) – A single signal operating independently in accordance with the status of local vehicle detection to achieve a point location oriented mobility goal.

• TRAFFIC RESPONSIVE (Behavior Accommodating) – A “team” of signals operating together (two axis data responsive signal control) in accordance with wide area vehicle detection to achieve a corridor oriented mobility goal.

• TRAFFIC ADAPTIVE (Route Perceptive – Behavior Accommodating) – A “team” of signals operating together (three axis data responsive wide-area signal control) in accordance with wide area vehicle detection to achieve a grid oriented mobility goal. (Outside of today’s presentation scope.)
TIME OF DAY OPERATING MODES

• FREE (in the overnight)
• Coordination (Y/N ? – per schedule)
• Variable Cycle Length (per schedule)
• Compromise Offset (per schedule)
• Holiday Exception Days (pre-programmed)
TRAFFIC RESPONSIVE OPERATING MODES

• FREE (whenever feasible)
• Coordination (based upon demand)
• Variable Cycle Length (road data driven)
• Variable Offset (road data driven)
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150 sec C/L
140 sec C/L
130 sec C/L
120 sec C/L
110 sec C/L
CLOSED LOOP CONTROL SYSTEM CONCEPTS

Stability (computer output vs system reaction)

• If “X”, Then “Y” (“Y” had better address “X” or else…)
• Computer input data as it relates to traffic (Volume – Occupancy)
• Mathematical correlation between data and intent (the purpose of “k” in V+kO)
• Free Stream vs Signalized - V and O data (why and how of V+kO)
Effect of "k" in V+kO (k=1)
Effect of "k" in V+kO (k=900)
“TRANSITION” MITIGATION

• Underlying Traffic Pattern Design (stable platform)
• Signal Controller (coordinator) Programming
• Algorithm Definition (constraints)
• Algorithm “Tuning” (stability - S/N ratio)
• Long term monitoring
DISASTER PLANNING

• Controller clocks constantly updated by central system
• Backup TBC/TOD resides on-board at the controller
• Backup TBC replicates (simplified) TR performance
• Long-term plan to maintain controller clocks
• Technician training regarding “clock hygiene”
SUMMARY

TRAFFIC RESPONSIVE SIGNAL COORDINATION IS;

• Attainable
• Sustainable
• Available
• Efficient
OPEN DISCUSSION

• Questions?
• Comments…. 
• Criticism!
• Complaints!