Summary of U.S. Adaptive Traffic Control
(Survey Conducted Summer 2009)
& InSync Highlights

Contact:
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Research Goal

- Provide useful information for practitioners
- Support decision processes
- Identify needs
Why so few?

- 38 Systems Identified
What systems are there?

- U.S. Developed
  - ACS-Lite
  - ATSAC (LADOT)
  - OPAC
  - RHODES
- Other Systems
  - SCOOT
  - SCATS
Research Targeted

- Maintenance
- Cost
- Reliability

Adaptive Traffic Control System

Operations?
Overall Costs

Costs by Component:
- Maintenance: $120,000
- Reliability: $140,000
- Adaptive Traffic Control System: $80,000

Overall System Costs:
- ACS LITE: $34,000
- OPAC: $100,000
- SCOOT: $40,000
- SCATS: $40,000

ACS LITE costs are below the $55,000 threshold.
Maintenance

- Initial implementation
- Fine tuning
- Training
- On-going maintenance
Install Effort

Installation and Fine Tuning

<table>
<thead>
<tr>
<th>System</th>
<th>Total Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACS-Lite</td>
<td>0 hrs</td>
</tr>
<tr>
<td>OPAC</td>
<td>200 hrs</td>
</tr>
<tr>
<td>SCOOT</td>
<td>600 hrs</td>
</tr>
<tr>
<td>SCATS</td>
<td>400 hrs</td>
</tr>
</tbody>
</table>
Ongoing Maintenance

Hours of Maintenance Per Week

- ACS-Lite
- OPAC
- RHODES
- SCOOT
- SCATS

- 0 hrs
- 10 hrs
- 20 hrs
- 30 hrs
- 40 hrs
System Reliability

- System downtime
- Reasons for downtime
- Would you do it all over again?
Downtime

Percent Offline

ACS-Lite | OPAC | RHODES | SCOOT | SCATS

0% | 20% | 40% | 60% | 80%

100%
The Issues

- Blockers to widespread implementation
  - Cost
    - Equipment replacement
    - Staff time
    - Deployment time
  - Reliability
  - The U.S. Experience
- Technology – Real-time instead of responsive
Redefining Adaptive

• Responsive Adaptive
• Real-time Adaptive
Implementation Time
Implementation Cost

$25k  $25k  $25k
Equipment Replacement
Staff Time

- None required for installation
- Minimal overview (less than 15 min per week)
Reliability

- No complaints
- Next to zero staff time
Does it Work?  . . . . . YES

- MO-291 Before / After Data

## Stops

<table>
<thead>
<tr>
<th></th>
<th>North Bound</th>
<th></th>
<th></th>
<th>South Bound</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before</td>
<td>After</td>
<td>Change</td>
<td>%</td>
<td>Before</td>
<td>After</td>
</tr>
<tr>
<td>AM</td>
<td>0.6</td>
<td>0.8</td>
<td>-0.2</td>
<td>-28.6%</td>
<td>3.5</td>
<td>0.2</td>
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<tr>
<td>AMOP</td>
<td>0.8</td>
<td>0.7</td>
<td>0.1</td>
<td>7.7%</td>
<td>4.4</td>
<td>0.2</td>
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<tr>
<td>NOON</td>
<td>1.8</td>
<td>0.8</td>
<td>1.0</td>
<td>54.2%</td>
<td>4.7</td>
<td>0.8</td>
</tr>
<tr>
<td>PM</td>
<td>1.5</td>
<td>1.1</td>
<td>0.4</td>
<td>24.7%</td>
<td>2.6</td>
<td>1.4</td>
</tr>
<tr>
<td>NIGHT</td>
<td>1.5</td>
<td>0.3</td>
<td>1.3</td>
<td>83.3%</td>
<td>1.7</td>
<td>1.4</td>
</tr>
</tbody>
</table>
Does it Work? Does it Work? . . . . . YES. . . . . YES

Time/Space Trajectories of All Runs
Thick (blue) lines = Before Runs; Thin (red) lines = After Runs

<table>
<thead>
<tr>
<th>Distance</th>
<th>Scale 1 in. = 2000 feet</th>
<th>Time into Run (secs)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NE Mulberry ST</td>
<td></td>
<td></td>
<td>120 (2 min.)</td>
<td>240 (4 min.)</td>
<td>360 (6 min.)</td>
<td>430 (8 min.)</td>
</tr>
<tr>
<td>NE Tudor RD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NE Swann DR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E Chipman RD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NE Columbus ST</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E Langsford RD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd Street</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5th Street</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bayberry LN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE Blue PKWY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highway 50 - N Ramp</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highway 50 - S Ramp</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Adaptive 2010

- You owe it to your agency and the public to investigate adaptive technology
- InSync and SCATS are the likely options
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## Simulation Testing

<table>
<thead>
<tr>
<th>Network Results Parameters</th>
<th>Traditional Optimized (sec/veh)</th>
<th>InSync (sec/veh)</th>
<th>% Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ave delay (sec/veh)</td>
<td>27.2</td>
<td>24.3</td>
<td>-11.3%</td>
</tr>
<tr>
<td>Ave stopped delay (sec/veh)</td>
<td>12.5</td>
<td>10.1</td>
<td>-19.5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Route Travel Time</th>
<th>Traditional Optimized (sec/veh)</th>
<th>InSync (sec/veh)</th>
<th>Difference (sec/veh)</th>
<th>% Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>EB Pioneer</td>
<td>313.4</td>
<td>267.8</td>
<td>-45.6</td>
<td>-14.6%</td>
</tr>
<tr>
<td>WB Pioneer</td>
<td>314.2</td>
<td>296.4</td>
<td>-17.8</td>
<td>-5.7%</td>
</tr>
<tr>
<td>EB Pioneer to SB I-5</td>
<td>240.0</td>
<td>209.3</td>
<td>-30.7</td>
<td>-12.8%</td>
</tr>
<tr>
<td>NB I-5 to WB Pioneer</td>
<td>256.6</td>
<td>254.4</td>
<td>-2.2</td>
<td>-0.9%</td>
</tr>
</tbody>
</table>
Where InSync is Operating?

- Little Rock, AR
- Rogers, AR
- Joplin, MO
- Lee’s Summit, MO
- Jane, MO
- Columbia, MO
- Lenexa, KS
- Overland Park, KS
- Evans, GA
Simulation Testing
Color Palette

- R 24  
  G 81  
  B 151

- R 221  
  G 169  
  B 62

- R 54  
  G 146  
  B 98

- R 255  
  G 255  
  B 255

- R 45  
  G 52  
  B 124

- R 142  
  G 106  
  B 40

- R 200  
  G 77  
  B 71

- R 49  
  G 25  
  B 15