ATSPM Rural Applications - Arizona Experiences

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Phoenix, Arizona
• Regional ATSPM Deployment in Greater Phoenix Area (Jeff Jenq)
• Maricopa County Department of Transportation (MCDOT) rural ATSPM applications (April Wire)
Performance of a Traffic Signal

Describe inadequate signal timing...
Automated Traffic Signal Performance Measures (ATSPM)

Collects high-resolution data

Compatible Controllers:
- Econolite Cobalt: Any Version
- Econolite ASC3 NEMA: V. 2.50+ & OS 1.14.03+
- Econolite 2070 with 1C CPU Module: V. 32.50+
- Intelight Maxtime: V. 1.7.0+
- Peek ATC Greenwave 03.05.0528+
- Trafficware 980ATC V. 76.10+
- Siemens M50 Linux & M60 ATC
  - ECOM V. 3.52+
  - NTCIP V. 4.53+
Maricopa County Regional Deployment/AZTech:
- UDOT ATSPM V4.0 (2016)
- Open Source available on USDOT OSADP, GitHub

Other ATSPM solutions
- ATSPM software products that work with ATSPM compatible controllers
- Solution to legacy controllers
Regionally Shared ATSPM

AZTech RADS ATSPM Multi-Jurisdiction Configuration
## Participating Jurisdictions

<table>
<thead>
<tr>
<th>Jurisdictions</th>
<th>Controller Type</th>
<th>No. of Signals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maricopa County</td>
<td>ASC/3, Cobalt</td>
<td>115</td>
</tr>
<tr>
<td>Tempe</td>
<td>ASC/3</td>
<td>108</td>
</tr>
<tr>
<td>Peoria</td>
<td>ASC/3, Intelight Maxtime</td>
<td>10</td>
</tr>
<tr>
<td>Gilbert</td>
<td>ASC/3</td>
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<tr>
<td>Scottsdale</td>
<td>ASC/3, Cobalt</td>
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</tr>
<tr>
<td>Mesa</td>
<td>ASC/3, Cobalt</td>
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</tr>
<tr>
<td>ADOT</td>
<td>Cobalt</td>
<td>10</td>
</tr>
</tbody>
</table>
Maricopa County, AZ Quick Facts

- 4th largest county by population
- Population of 4.2 million people
- 9,224 sq. miles
- 27 cities and towns within the County boundaries
- Larger than some states
Traffic Signal Infrastructure

- Traffic signals are scattered throughout the County
- Few concentrated areas
- Most on the outer limits of urban areas
- Suburban or rural areas
Traffic Signal Infrastructure

- About 170 signalized intersections
- 122 controllers (70%) have communications
  - Fiber
  - Radio
  - Telephone lines (T1)
  - Cell Modem
- 115 collecting High Resolution Data (HRD) and integrated into the ATSPM system
Signal Operations

- Urban settings - faster identification of signal issues
  - More reliable communications infrastructure
- Rural settings - slower identification of signal issues and longer response/resolution time
  - Less reliable/no communications network
  - Longer distances to travel
- Urban & Rural - Without a tool agencies rarely revisit signal timing
Current Uses of ATSPM

• Identify detection failures
• Addressing citizen concerns
  • Split adjustments
  • Adjustments of TOD plans
• Justification for retiming projects
  • Review ATSPMs before starting the projects and data collection
• Monitoring Adaptive Signal Control Technology system performance
Detection Failures
BEFORE: Video detection not working at night

Minor street through & left turn max out at night only

- Gap out
- Max out
- Pedestrian activation
- Force off
- Skip
Detection Failures

**AFTER:** Detection repaired

Minor street through & left turn max out at night only

- Gap out
- Pedestrian activation (shown above phase line)
- Max out
- Skip
- Force off
Split Adjustments

- Left-turns maxing out
- Gap out
- Max out
- Force off
- Pedestrian activation (shown above phase line)
- Skip

Left-turns maxing out

Purdue Phase Termination
Split Adjustments

- Gap out
- Max out
- Force off
- Pedestrian activation (shown above phase line)
- Skip

Split Monitor
Adaptive Signal Control Technology
System Performance

Purdue Phase Termination

Bell Rd @ 99th Ave - SIG# 101119
Wednesday, October 10, 2018 12:00 AM - Wednesday, October 10, 2018 11:59 PM

Currently showing Force-Coffs, Max-Outs and Gap-Outs with a consecutive occurrence of 1 or more.
Pedestrian events are never filtered
Outcomes of ATSPM

- Identified need for more robust vehicle detection system
- Justification of need signal retiming projects & performance validation
Lessons Learned Applicable to Rural Settings

• Retrieval of data through cell modems and wireless radios or manually (Raspberry Pi device)
• Signal Technicians spend less time commuting to intersections
  • ATSPMs helped confirm if the issue is real or perceived
  • Less time troubleshooting issues
  • Have appropriate equipment on truck to resolve concern
• Helps determine if budget should be spent on retiming projects or other competing priorities
• Web-base application accessible through any device
  • Signal Central System is not web-based nor accessible on all devices
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