Coors Boulevard, Albuquerque, Automated Traffic Signal Performance Measures

2017 ITE Western District Annual Meeting
State of the Practice

• Program Management
  ▫ Weak connection to agency goals
  ▫ Ad-hoc business practices
  ▫ Lack of resources
  ▫ Outdated equipment

• Performance Assessment
  ▫ Complaint driven
  ▫ Reactive operations and maintenance
Where do we go from here?
Every Day Counts (EDC)

- State-based model to **identify** and **deploy** proven but underutilized innovations to:
  - Shorten project delivery process
  - **Enhance roadway safety**
  - **Reduce congestion**
  - Improve environmental sustainability
- EDC Rounds: two year cycles
- To date: 3 Rounds, 35 Innovations
- Initiating 4\(^{th}\) Round (2017-2018) – 11 innovations
Coors Boulevard NW

- Project Goals
  - Signal Coordination
  - Asset Management
  - Operations Management
- ATSPM System Evaluation
  - EDC/UDOT ATSPMs System
  - Econolite Clarity
- Installation and Evaluation of Advanced Detection
  - 47 Approaches
Coors Boulevard NW
Vehicle Detection - Existing

ATSPM Metrics
- Purdue Phase Termination
- Split Monitor

Introduction • Coors Boulevard • Construction Signal Timing • Albuquerque Rapid Transit • Conclusion
Vehicle Detection - Advanced

ATSPM Metrics

- Purdue Coordination Diagram
- Approach Volume
- Approach Speed
- Approach Delay
- Link Pivot
- Platoon Ratio
- Arrival on Green
ATSPM Behind the Scenes

- Access to Traffic Signal Network
- Simple Network Management Protocol (SNMP) Client
- Free File Transfer Protocol (FTP) Software
ATSPM Behind the Scenes

Introduction    •    Coors Boulevard    •    Construction Signal Timing    •    Albuquerque Rapid Transit    •    Conclusion
ATSPM Behind the Scenes

<table>
<thead>
<tr>
<th>Time stamp</th>
<th>Event Type</th>
<th>Parameter</th>
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<td>30:00.0</td>
<td>Controller Data Log</td>
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<tr>
<td>30:23.1</td>
<td>Phases in use</td>
<td>1  2  3  4  5  6  7  8</td>
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</table>

Introduction • Coors Boulevard • Construction Signal Timing • Albuquerque Rapid Transit • Conclusion
# ATSPM Behind the Scenes

## Version Information
- **Version**: 2
- **Made by**: Curtis Hefner
- **File**: ECON_10.19.2.204_2017_05_31_1545.dat
- **Intersection**: 10.19.2.204
- **IP Address**: 10.19.2.204
- **MAC Address**: 00:04:81:02:8b:ba
- **Controller Data Log Beginning**: 5/31/17 3:45 PM

## Controller Data Log

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<td>7.02472</td>
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<td>DET Channel # (1- 16)</td>
<td>Detector</td>
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## Introduction

- **Coors Boulevard**
- **Construction Signal Timing**
- **Albuquerque Rapid Transit**
- **Conclusion**
## ATSPM Behind the Scenes

<table>
<thead>
<tr>
<th>Time As Time</th>
<th>Event</th>
<th>Event Description</th>
<th>Phase # (1-16)</th>
<th>Description</th>
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<td>Phase End Yellow Clearance</td>
<td>Phase # (1-16)</td>
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<td>3:45:26 PM</td>
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<td>Phase Force Off</td>
<td>Phase # (1-16)</td>
<td>Set when phase force off is applied to the</td>
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</table>

### Coors Boulevard

- **Phase Begin Red Clearance**
- **Phase End Red Clearance**

### Conclusion

- Phase events reserved for future use.
### Introduction

Coors Boulevard Construction Signal Timing • Albuquerque Rapid Transit • Conclusion

<table>
<thead>
<tr>
<th>Timestamp</th>
<th>Event Typ</th>
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<tr>
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<td>8 Pedestrian Call Registered</td>
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<td>06/09/2017 7:08:35.2</td>
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<td>8 Pedestrian Begin Walk</td>
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</table>

**Phase 8**

Ped Actuations (PA) = 5; Min Delay = 00:16; Max Delay = 02:05; Average Delay (AD) = 01:22

<table>
<thead>
<tr>
<th>Free</th>
<th>Plan 21</th>
<th>Plan 23</th>
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<tbody>
<tr>
<td>1 PA</td>
<td>4 PA</td>
<td>0 PA</td>
</tr>
<tr>
<td>0 AD</td>
<td>2 AD</td>
<td>0 AD</td>
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Pedestrian Delay by Actuation

- **07**
- **08**

Pedestrian Delay by Actuation (minutes)

- **00:00** to **00:30**
- **01:00** to **01:30**
- **02:00** to **02:30**
- **03:00** to **03:30**

Time (Hour of Day)
Purdue Coordination Diagram

Coors Blvd NW @ Sequoia Rd - SIG#304
Monday, June 12, 2017 12:00 AM - Monday, June 12, 2017 11:59 PM
Advanced detector located 350 ft. upstream of stop bar

Phase 2: Southbound

AoG = 76%

<table>
<thead>
<tr>
<th></th>
<th>Free</th>
<th>Plan 21</th>
<th>Plan 23</th>
<th>Plan 25</th>
<th>Plan 23</th>
<th>Free</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AoG 80%</td>
<td>AoG 62%</td>
<td>AoG 78%</td>
<td>AoG 77%</td>
<td>AoG 84%</td>
<td>AoG 60%</td>
</tr>
<tr>
<td></td>
<td>GT 83%</td>
<td>GT 76%</td>
<td>GT 64%</td>
<td>GT 60%</td>
<td>GT 73%</td>
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<tr>
<td></td>
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<td>PR 1.22</td>
<td>PR 1.28</td>
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</tbody>
</table>

Introduction • Coors Boulevard • Construction Signal Timing • Albuquerque Rapid Transit • Conclusion
Purdue Coordination Diagram
Coors Blvd NW @ Sequoia Rd - SIG#304
Monday, June 12, 2017 12:00 AM - Monday, June 12, 2017 11:59 PM
Advanced detector located 350 ft. upstream of stop bar

Phase 6: Northbound
AoG = 93%

Free 93% AoG 86% GT 1.08 PR
95% AoG 80% GT 1.19 PR
93% AoG 71% GT 1.31 PR
90% AoG 66% GT 1.36 PR
96% AoG 76% GT 1.26 PR
Free 96% AoG 72% GT 1.33 PR

Introduction • Coors Boulevard • Construction Signal Timing • Albuquerque Rapid Transit • Conclusion
Split Monitor

Coors Blvd NW @ St. Josephs Dr - SIG#306
Monday, June 12, 2017 12:00 PM - Monday, June 12, 2017 2:00 PM

Phase 2

- Plan 23
- 116.5 - 85 Percentile Split
- 115.0 Avg. Split
- 98.0% ForceOffs
- 0.0% GapOuts
- 2.0% Skips

Phase Duration (Seconds)

Time (Hour of Day)
Coors Boulevard NW

- **Schedule**
  - **May**
    - Detection Installed
  - **June**
    - Server Installations
      - Centracs 2.0 and Clarity
      - UDOT ATSPMs
      - Network Storage System
    - Existing Conditions
  - **July**
    - Active ATSPM Management
Signal Management during Construction
Traditional Approach

- Construction Documents Requirements
  - Closed loop traffic control system
  - Turning movement counts throughout
  - Develop temporary and permanent timing plans
  - Observe and optimize intersection performance

- Significant Travel Time for Manual Implementation

- Multiple Construction Phases
  - Constant lane closure/rerouting
Proposed Approach

• Implement Signal Performance Measures
  ▫ Reuse use existing video detection
  ▫ Purchased cellular modem for communication
  ▫ Upload signals to Lee Engineering ATSPM Webserver

• Reduce travel time/field visits
• 24-7 data collection
• Remote observations and control

Save time and money and make better, more informed decisions.
Albuquerque Rapid Transit (ART)

- Central Avenue (Route 66)
  - Building upon the ART System Upgrades
  - Installation of Advanced Radar Detection
  - Complimentary to Transit Signal Priority (TSP) Systems
    - Provide additional data to implementation designers
    - Active ATSPMs management
    - Develop TSP ATSPM statistics
ATSPM Benefits

• Increased Safety
  ▫ Proactive operations and maintenance practices
• Targeted Maintenance
  ▫ Provide actionable information, significant agency cost savings
• Improved Operations
  ▫ Active monitoring of signalized intersection performance

ATSPMs provide affordable and sustainable system improvements by leveraging existing resources more effectively.
Thank you!

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