ROADS, RAILS, AND RUNNING SHOES:
DEVELOPING MULTI-MODAL SIGNAL TIMING FOR A NEW LIGHT RAIL CORRIDOR IN AURORA, COLORADO

ITE Western District Annual Meeting 2016
Albuquerque, NM
Presented by Victoria Edington
July 12, 2016
FasTracks

- transit expansion program throughout Metro Denver
- voter-approved in 2004
- 4 rail lines opening in 2016

Source: http://www.rtd-denver.com/Fastracks.shtml
10.5 miles of new light rail have been added as part of the Aurora Line/ I-225 Rail construction.
• 8 new stations
• 19 new at-grade crossings
• 3 subareas
  o Area B: City Center
  o Area E: Fitzsimons
  o Area G: Peoria
Timing Parameters

Vehicles, Cyclists, and Pedestrians
- intersecting corridors of coordination
- lengthy pedestrian clearance times
- turning vehicles conflict with train tracks

Trains
- level of priority vs. vehicles
- minimum track clearance times
- speed and length of trains
<table>
<thead>
<tr>
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<th>Strengths</th>
<th>Weaknesses</th>
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<tr>
<td><strong>Vissim</strong></td>
<td>• multi-modal operations&lt;br&gt;• multiple controller types&lt;br&gt;• real-time visualization&lt;br&gt;• quantifiable results</td>
<td>• signal optimization and coordination&lt;br&gt;• inter-signal communication</td>
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<td><strong>Synchro</strong></td>
<td>• signal optimization and coordination&lt;br&gt;• time-space diagrams&lt;br&gt;• quantifiable results</td>
<td>• modes other than vehicles&lt;br&gt;• inter-signal communication</td>
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<td><strong>Bench Testing</strong></td>
<td>• field controllers&lt;br&gt;• inter-signal communication&lt;br&gt;• real-time visualization</td>
<td>• signal optimization and coordination&lt;br&gt;• quantifiable results</td>
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Initial Timing Plans

outlined on paper how trains and other modes should interact within each segment

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Legend

Traffic Signal and LRT Holding Signal Green
Traffic Signal and LRT Holding Signal Yellow
Traffic Signal and LRT Holding Signal Red
Blank-Out Sign Active
Railroad Warning Lights Flash
Railroad Gate Descent and Ascent
Railroad Gate Down

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<td>Phase 2 NBT (32) Offset 72</td>
<td>Phase 3 WBL (25)</td>
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<td>Phase 6 SBT (33) Offset 84</td>
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<td>Phase 6 SBT (33)</td>
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| 00 | 05 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
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Peak Hour Modeling

- detailed timing plans included train operations
- gates could be linked between multiple crossings
- results presented using both data and videos

Two trains crossing Alameda Avenue parallel to Sable Boulevard in the Vissim model of Area B
Bench Testing

- Signal and gate controllers will be installed in the field
- Individual light boards for each crossing
- External computer provides train information to the controllers
Bench testing setup for Area E along Fitzsimons Parkway in the middle of a simulated train crossing
Alameda Ave & Sable Blvd
QUESTIONS?

Victoria Edington, E.I.T.
Stantec
victoria.edington@stantec.com

Anna L Bunce, P.E.
City of Aurora
abunce@auroragov.org

Brett Higgins, P.E.
Regional Transportation District
brett.higgins@rtd-denver.com

W. Freddy He, Ph.D., P.E., P.T.O.E.
Stantec
freddy.he@stantec.com