Implementing a Regional Transit Signal Priority (TSP) System in Northeastern Illinois

Transport Chicago
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OUTLINE

• What – Transit Signal Priority (TSP)
• Why – Improve Bus Performance
• How – Regional TSP Program & Standards
• Where – 400 Intersections, 13 Corridors, 1 System
• When – Implementation in 2016 to 2018
• Who – TSP Working Group
• Challenges & Opportunities
TRANSIT SIGNAL PRIORITY (TSP)

- Late buses request extra green time
- Uses GPS & Wi-Fi
- Supports ART and BRT
PERFORMANCE MEASURES

• General vehicle travel time
• Bus travel time
  – Travel time variability
  – Bus stops due to red signals
  – Bus delay at traffic signals
• Data collection & analysis
  – Baseline (before improvements)
  – After traffic signals are optimized
  – After TSP is operational
PERFORMANCE MEASURES

• Distribution Plot of Travel Time Variability
REGIONAL TSP PROGRAM

• Builds on previous TSP Demos in the region:
  – Cermak Road (IDOT, CTA, Pace) in 1997
  – Western Avenue (RTA, CTA, CDOT) in 2008-2010
  – Harvey Transp. Center (RTA, Pace, IDOT) in 2010-2011
  – Washington Street (Pace, Lake Co.) in 2014
  – Jeffrey Jump (CTA, CDOT) in 2014

• Need to develop & implement a regional program
• $40 million CMAQ grant (90% federal, 10% RTA)
• Plus other federal and local grants
GUIDING PRINCIPLES

• Interoperable System
  – Different transit and highway jurisdictions
  – Any bus, any traffic signal (properly equipped)

• Open Architecture
  – Industry standard communication protocols
  – Vendor neutral, off-the-shelf equipment

• Use Existing Equipment if possible
  – Bus Automatic Vehicle Location (AVL) systems
  – Traffic Signal Controllers
  – V-2-I, I-2-I and I-2-C Communication
REGIONAL TSP STANDARDS

• Vehicle-to-Intersection TSP Message Set
  – Defines the information communicated between the bus and the traffic signal controller

• 5.0 GHz Wi-Fi with 802.11n (or 802.11ac) protocol
WHERE?

• 400 Intersections
• 100 Miles of Roads
• 13 Corridors
• 1 TSP System
TSP PRIORITY CORRIDORS

• CTA TSP Corridors (≈ 200 signals)
  – Ashland Avenue
  – Western Avenue

• Pace TSP Corridors (≈ 200 signals)
  – Milwaukee Avenue
  – Dempster Street
  – Roosevelt Road
  – Cermak Road
  – Grand Ave. (Lake Co.)
  – I-90 Corridor Access
  – Cicero Avenue
  – Halsted Street
  – 95th Street
  – Sibley Blvd./147th St.
  – 159th Street
TSP IMPLEMENTATION SCHEDULE

• CTA/CDOT implementing TSP on S. Ashland Ave. in spring 2016 and on Western Ave. in late 2016
• North and Central Ashland require traffic signal modernization and will follow in 2017/2018
• Pace proof-of-concept test with IDOT, CDOT, and CTA in late 2016/early 2017 on Milwaukee Ave.
• Pace/IDOT implementing TSP on Milwaukee Ave. and 10 other corridors in 2017 and 2018

6/6/2016
TSP IMPLEMENTATION ON S. ASHLAND

• New signal controller (ATC) -- Ashland @ 95th St.
TSP IMPLEMENTATION ON S. ASHLAND

• New Communication Box (C-Box) – Ashland @ 35th St.
TSP WORKING GROUP & ROLES

• RTA – Program Management
• CTA and Pace – Primary TSP Implementers
• CDOT and OEMC – City traffic signals & communication upgrades
• IDOT – Traffic signals & permits
• County DOT’s (Lake, Cook, DuPage) – Traffic signals & permits as necessary
• CMAP and FTA – Funding partners
• Various consultants
CHALLENGES / OPPORTUNITIES

• Lot’s of agencies / cooperation has been great
• Field data is cumbersome / AVL data is promising
• Many traffic signal controllers are dated / testing new Advanced Traffic Controllers
• Intersection-to-Center communication is limited / TSP could help fill some communication gaps
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