

# Regional Transit Signal Priority (TSP) Implementation Program

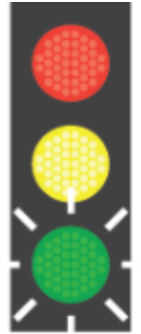
Advanced Technology  
Task Force (ATTF) /  
Regional Transportation  
Operations Coalition (RTOC)  
Joint Meeting  
August 18, 2016

Mark E. Pitstick  
Kevin D. Staniel



MOVING YOU

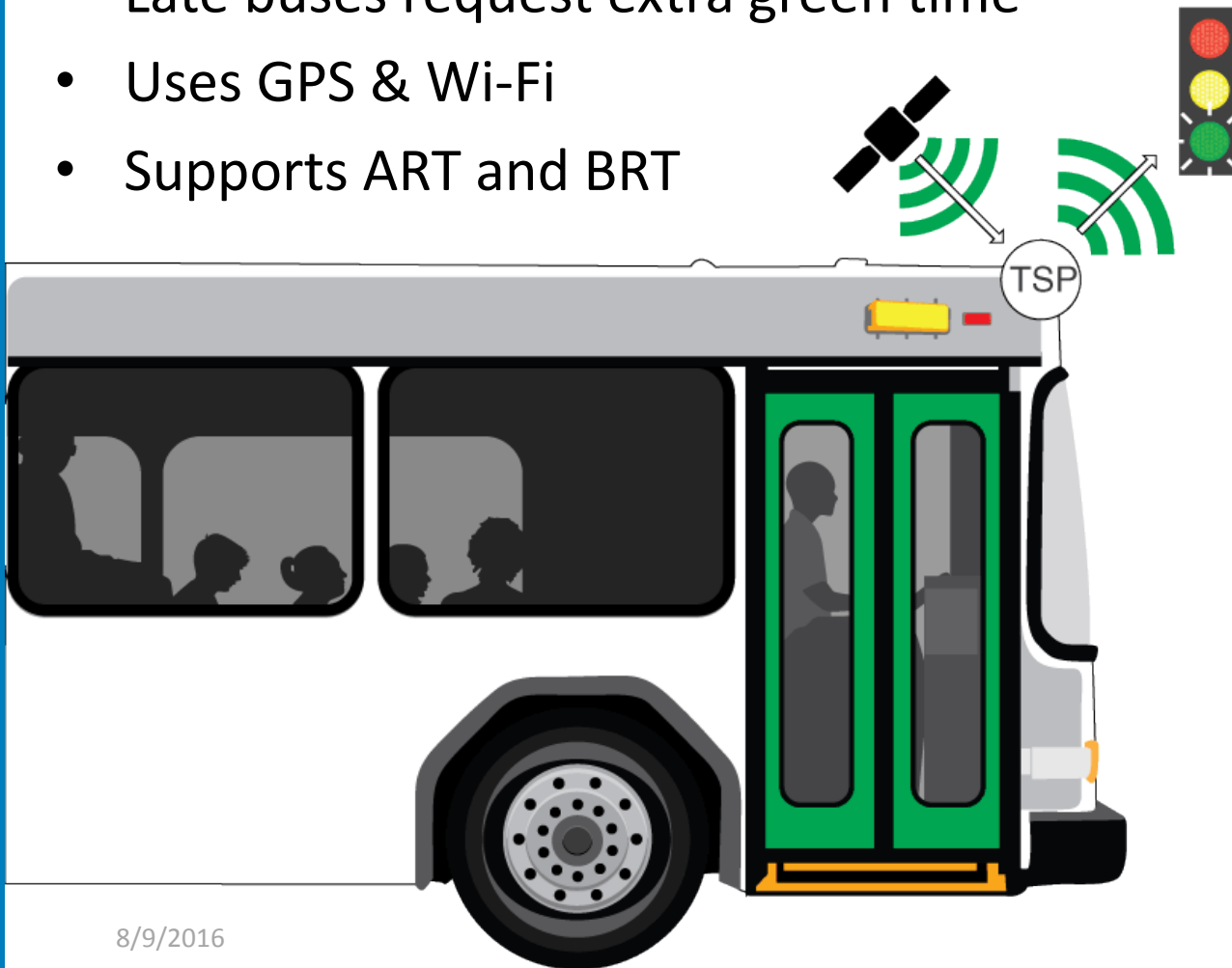
# OUTLINE



- 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
- CMAQ Scope Change Approved in July 2016

# TRANSIT SIGNAL PRIORITY (TSP)

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



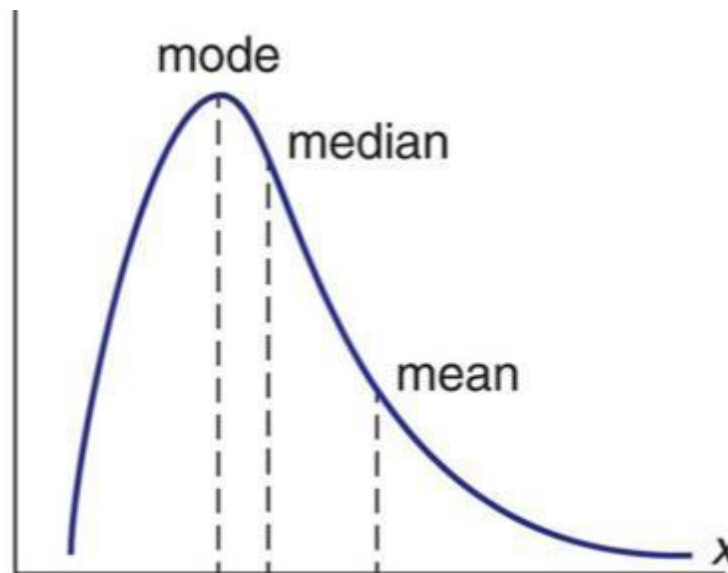
# PERFORMANCE MEASURES

- General vehicle travel time
  - First step is to optimize signals
- 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

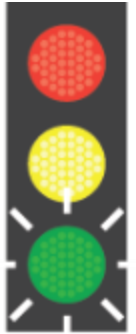


# PERFORMANCE MEASURES

- Distribution Plot of Bus Travel Time Variability

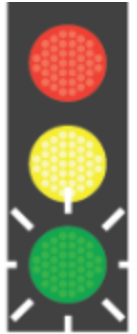


# REGIONAL TSP PROGRAM



- 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

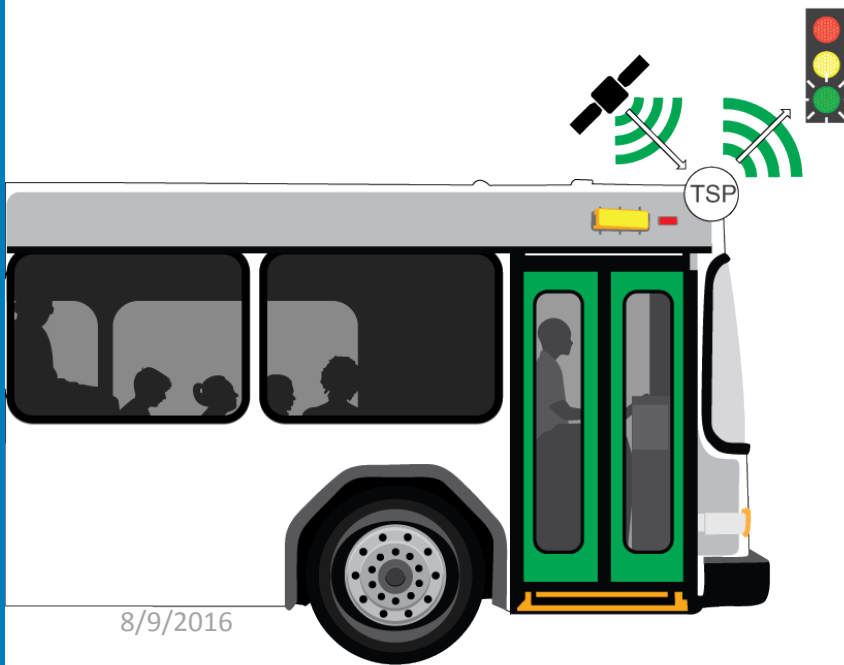
# GUIDING PRINCIPLES



- 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

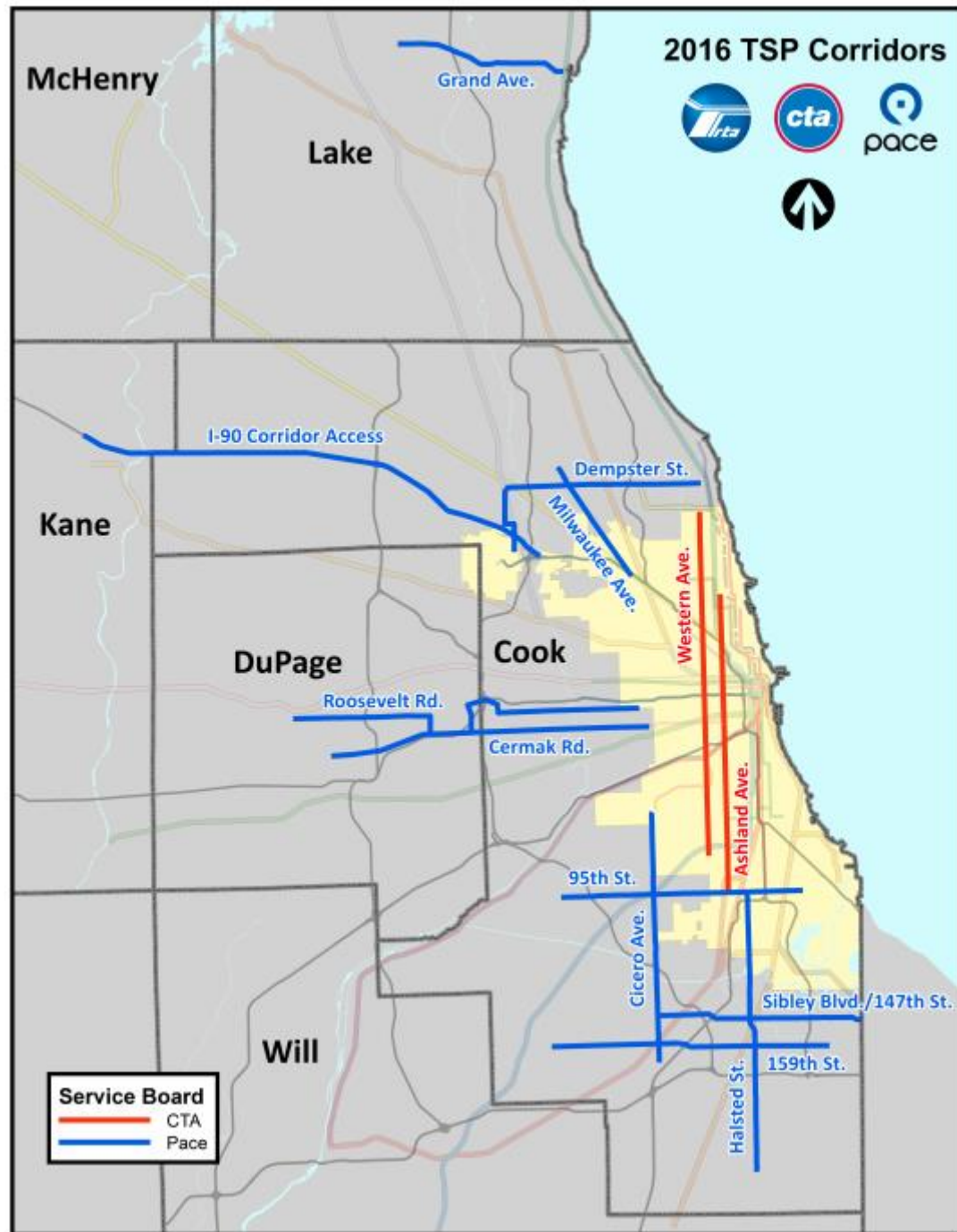
- Vehicle-to-Intersection TSP Message Set
  - Defines the information communicated between the bus and the traffic signal controller
- 5.0 GHz Wi-Fi with 802.11n (or 802.11ac) protocol





# WHERE?

- 400 Intersections
- 100 Miles of Roads
- 13 Corridors
- 1 TSP System



# TSP PRIORITY CORRIDORS

- CTA TSP Corridors ( $\approx$  200 signals)
  - Ashland Avenue
  - Western Avenue
- Pace TSP Corridors ( $\approx$  200 signals)
  - Milwaukee Avenue
  - Dempster Street
  - Roosevelt Road
  - Cermak Road
  - Grand Ave. (Lake Co.)
  - I-90 Corridor Access
  - Cicero Avenue
  - Halsted Street
  - 95<sup>th</sup> Street
  - Sibley Blvd./147<sup>th</sup> St.
  - 159<sup>th</sup> 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 Ave. require traffic signal modernization and will follow in 2017/2018
- Pace/IDOT have already optimized most signals
- Pace proof-of-concept test with IDOT, CDOT, and CTA in late 2016/early 2017 on Milwaukee Ave.
- Pace/IDOT to implement TSP on Milwaukee and 10 other corridors in 2017 and 2018



# TSP EQUIPMENT ON CTA BUSES

- New Rocket Routers for Mobile Wi-Fi on Nova bus



# TSP EQUIPMENT ON CTA BUSES

- New Rocket Routers for Mobile Wi-Fi on New Flyer bus



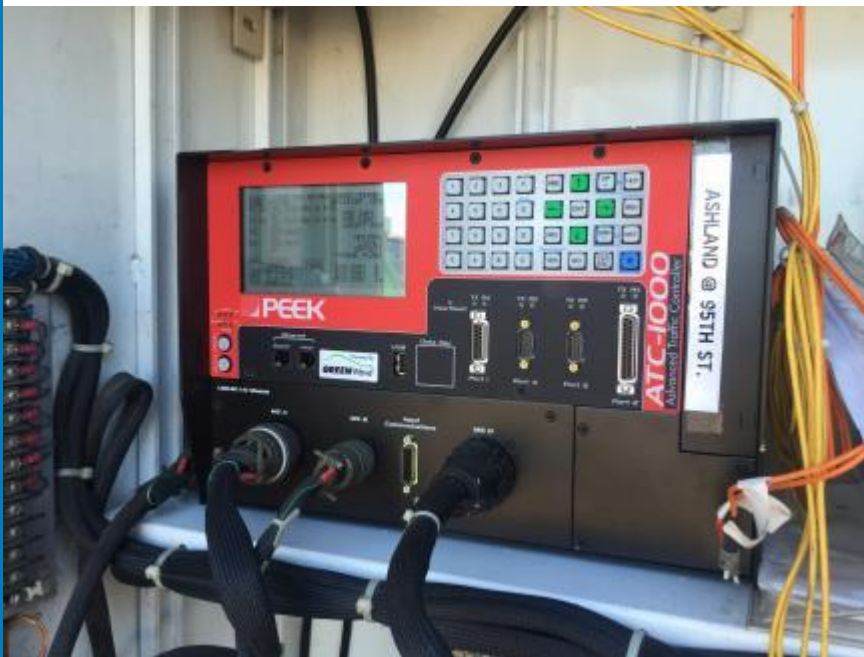
# TSP IMPLEMENTATION ON S. ASHLAND

- New Communication Box (C-Box) – Ashland @ 35<sup>th</sup> St.



# TSP IMPLEMENTATION ON S. ASHLAND

- New advanced traffic controller (ATC) – Ashland @ 95<sup>th</sup> 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



Chicago Metropolitan Agency for Planning



U.S. Department of Transportation  
Federal Transit Administration



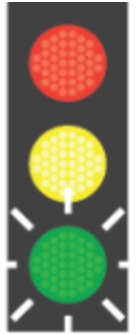


# CHALLENGES / OPPORTUNITIES

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



# CMAQ SCOPE CHANGE



- Changes
  1. Reduced number of TSP corridors and intersections
  2. Added traffic signal modernization on North and Central portions of Ashland Avenue
- Reasons
  1. Need to replace traffic signal controllers and add communication equipment
  2. Coordinate with CTA's CMAQ grant for TSP and signal interconnect on North/Central Ashland
- Approved by CMAQ Committee in July 2016

# STAY CONNECTED



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