

Bus Transit Signal Priority Overview



Bus Transit Signal Priority Project Overview

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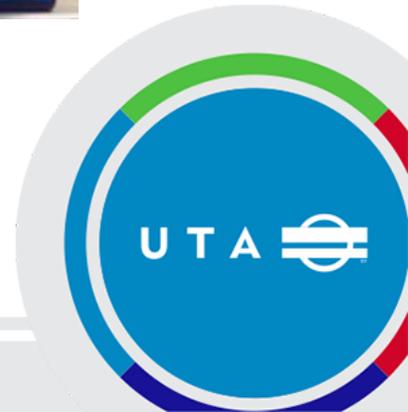
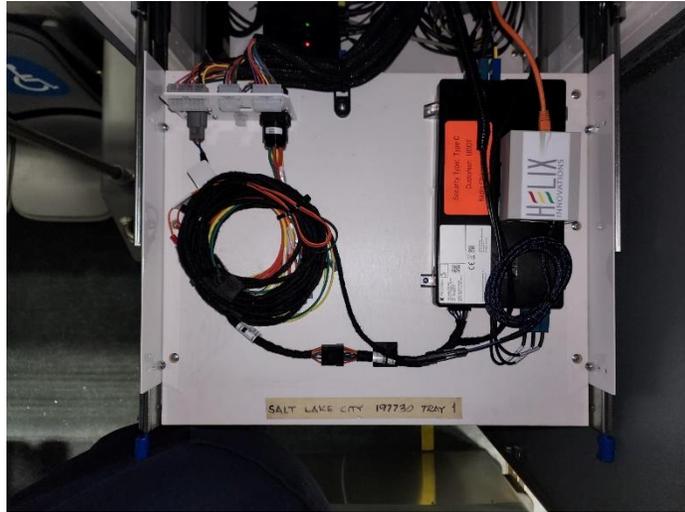
MSP270



Intro: What is Transit Signal Priority (TSP)?

A technology that helps to reduce the waiting time for public transit vehicles at intersections

In partnership with UDOT, the UTA TSP project modifies traffic signal timing by allowing a longer green light for buses that are late



Benefits

TSP can reduce transit travel time, increase reliability, and improve the overall customer experience

Specific examples of reduced bus travel times in other cities

- 8-10% in Seattle, Los Angeles, and Portland
- 4-15% in Minneapolis
- 15% in Chicago

UTA has benefited from TSP increasing bus reliability

- Route 217: On-time reliability +5% with 19% less schedule variability
- UVX: Large improvements in reliability

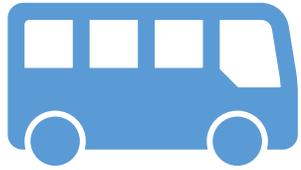


New Benefits Anticipated

- Reduce bus travel times by **15%** while maintaining **88%** reliability
- Innovative, new connected corridor and connected vehicle applications
- Potential for:
 - Increased ridership as TSP makes bus travel more attractive to customers
 - New safety applications
 - Reduced emissions
 - Increase Route efficiency by redefining what 'late' means



Costs



Total cost of implementing TSP is \$2.7 million over 5 years

Equipment: \$6,200 per bus installed

Operations & Maintenance: \$70,000 per year

Mobilization: Varies by installation plan

Recognize UDOT's significant partnership

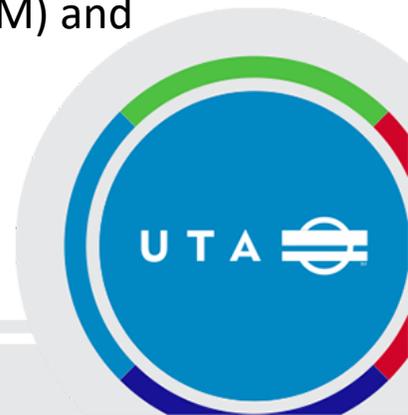


Potential cost savings and return on investment hinges on reducing transit delays

Increases efficiency, if possible, to “cut a bus”

Uses less fuel

Cost savings from faster bus service may fully offset Operations & Maintenance (O&M) and fund additional service



Technology

- Technology:
 - "Vehicle to Everything" (V2X) technology – a transportation-specific wireless technology licensed by the Federal Communications Commission in an allocated spectrum
 - Short-range, two-way, low-latency (very fast communication)
 - Communications are secured – prevents misuse, hacking, and interference
 - Standards-based technology – non-proprietary, available from multiple vendors
 - Customization built by UDOT – adapt to UTA on-board systems, determine bus lateness
- The technology has evolved
 - Earlier deployments (Redwood Road / Utah Valley Express or UVX) used "Dedicated Short-range Radio Communication" (DSRC) Technology
 - Current deployments use "C-V2X" technology
 - UDOT is replacing the DSRC technology to conform to the new standard



Technology, cont.

- There are other technologies that enable TSP
 - We chose V2X because it can do more than TSP – a versatile, multi-capable technology
 - Ultimate goal is safety – crash avoidance
 - UDOT uses this technology to:
 - Improve snowplow performance
 - Send a warning into a vehicle about an icy road or sharp curve
 - Working on applications to warn about pedestrian presence
- The on-board system connects to the vehicle CAN bus (J1939)
 - Reports information about vehicle movements – speed, braking, windshield wipers, etc.
 - This facilitates safety-based applications
 - Data can be mined to study operations and conditions



Compatibility

- Compatibility: Is TSP compatible with other transit technologies and systems already in use by UTA? Such as the Automatic Vehicle Location (AVL) system, and real-time passenger information displays.
- Information Technology (IT) support for TSP bus communications: installations / coordination with Operations / IT programming / Data monitoring / Mobile Data Device (MDD) transition / Sign out for TSP
- Future inclusion on new fleet orders / Diesel & electric buses
- Enabling Operations & Maintenance (O&M) / State of Good Repair (SGR)
- How do we know if the technology is working?



Implementation

What are we trying to accomplish?

Better Customer Experience

What does good look like?

Cut travel times by 15%, keep 88% reliability

What does the data say?

Existing travel times TBD, reliability TBD%

What are we going to do?

Deploy C-V2X TSP on Core Routes & BRT

When?

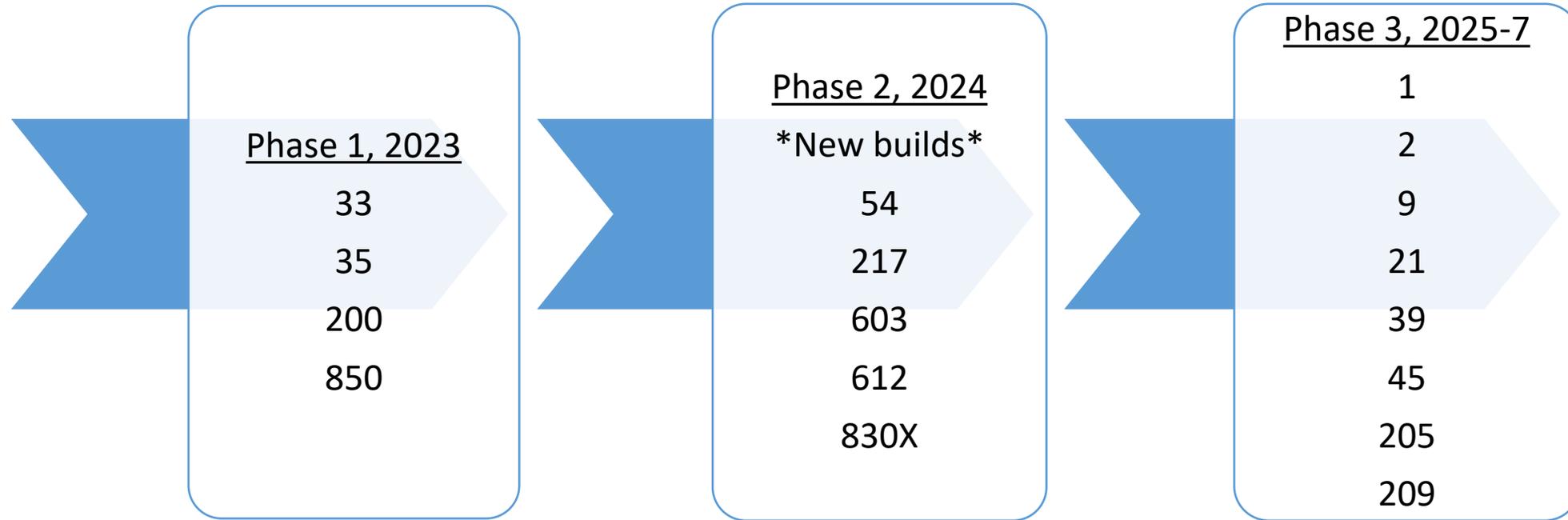
Now through 2027

How well is it working?

- Measure Key Performance Indicators (KPIs)
- Milestones by garage



Implementation, cont.

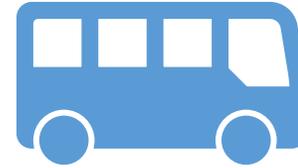


Impact



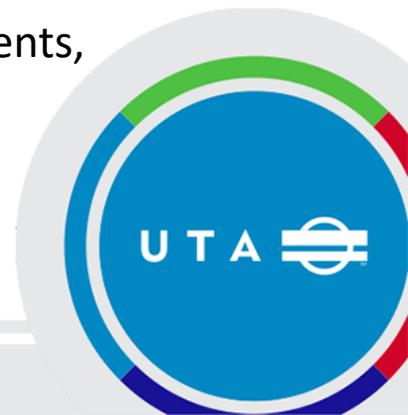
Expected overall impact of TSP on the transportation system

- Minimal impact on cross-street traffic flow
- Positive impact on safety
- Positive impact on air quality, ridership, equity



Potential risks or unintended consequences

- TSP can't do it alone
- Evolving system
- UDOT + many other partners
- Address through collaboration, agreements, regional planning, etc.



Questions & Discussion

Thank you

