



THE UNIVERSITY OF TEXAS AT AUSTIN
CENTER FOR TRANSPORTATION RESEARCH

Transit Performance and Reliability Evaluation for Arterial Corridors

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Outline

1. Background
2. Introduction
3. Case Study
4. Metrics
5. Future Work

Background

Corridor Mobility Program

- Development, design, and construct improvements along key Austin corridors that enhance mobility, safety, and connectivity for all users.
- Recommendations supported by identifiable **metrics** to prioritize:
 - a) reduction in congestion
 - b) improved level of service for all modes of travel
 - c) connectivity, and improved effectiveness of transit operations

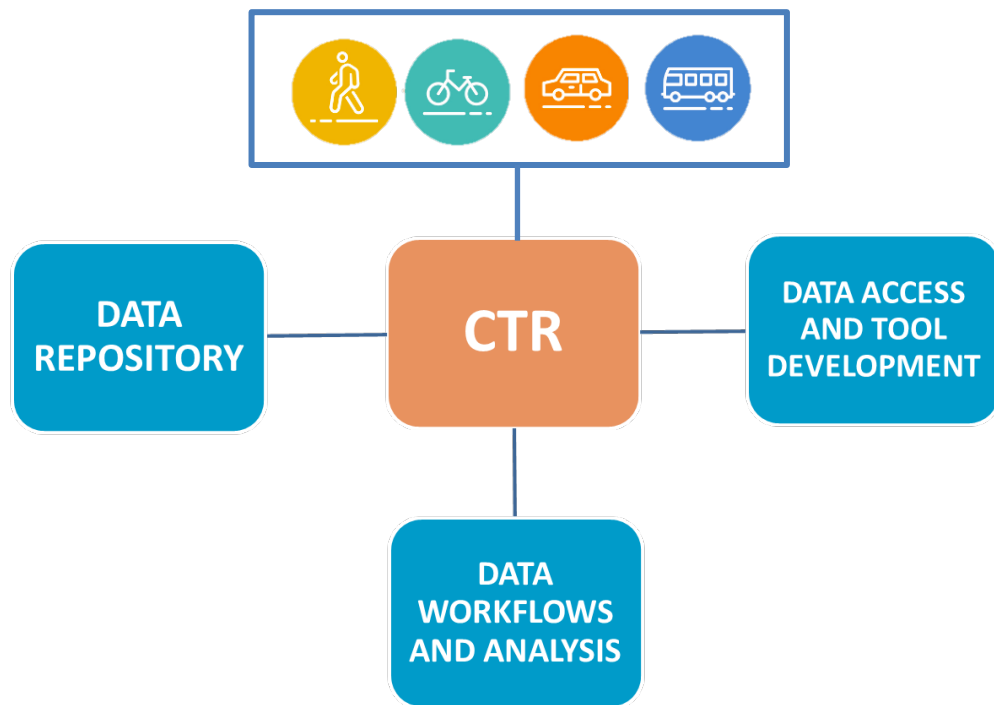


Background

Our Role

Generate performance metrics for bond corridor evaluation by practitioners

1. Identify current and future data sources
2. Complete back office system architecture capable of ingesting data from multiple sources
3. Develop a tool that uses data from multiple sources to calculate key performance metrics

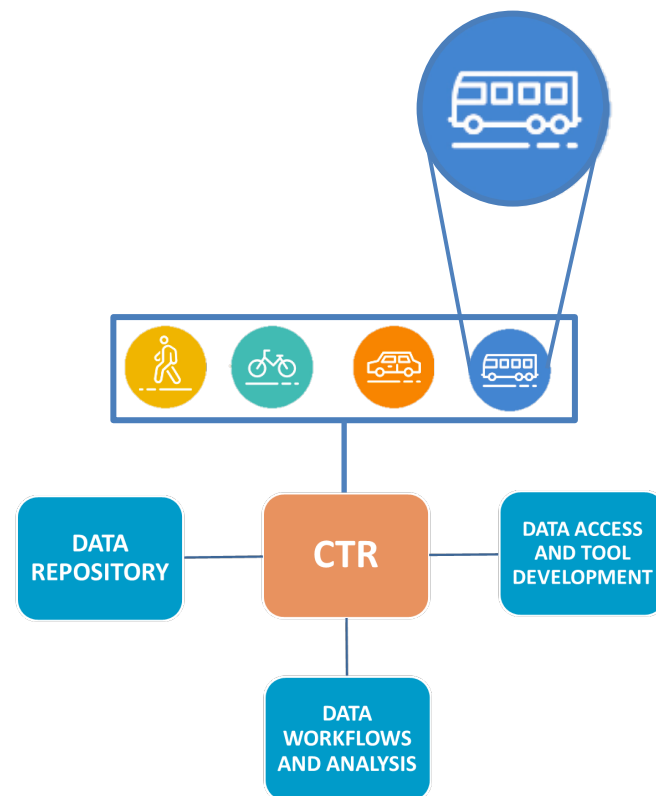


Introduction

Recent advances in ITS transit data-collection allow evaluation of multiple operational variables.

Problem

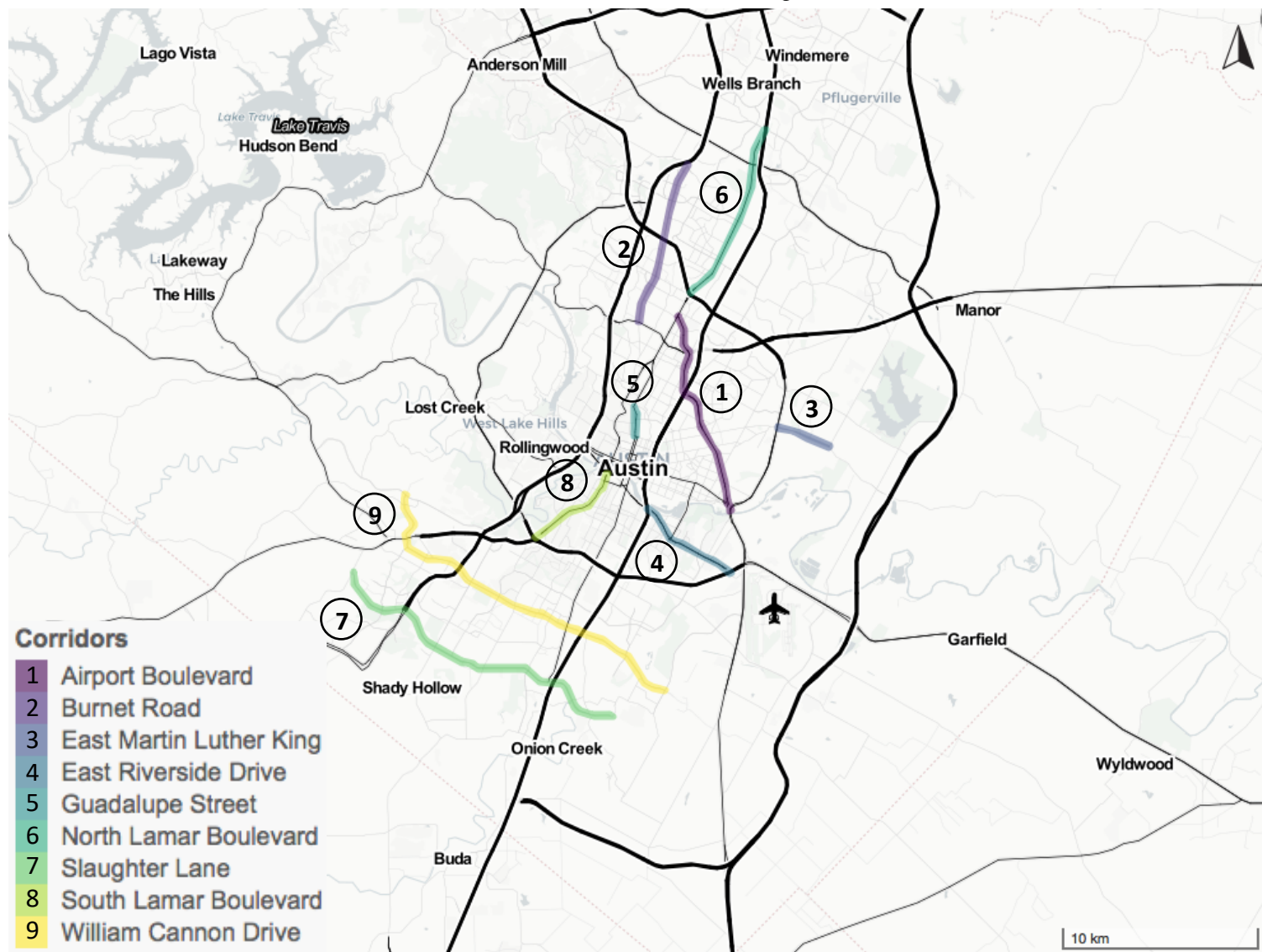
- Digesting and understanding the large amount of complex data available
- For arterial corridors: the presence of different traffic control systems, multiple transit routes, and multimodal interaction



Objective

Develop an evaluation tool to provide **transit performance and reliability** information for arterial corridors in Austin, Texas.

Case Study



Metrics: Tool Development

Data Sources

GTFS

AVL

APC

Vehicle Capacity



Automated
Analysis



Measurable Impacts

Transit Speed

Ridership

Occupancy

Dwell Time

Delay

Volume-to-Capacity
Ratio

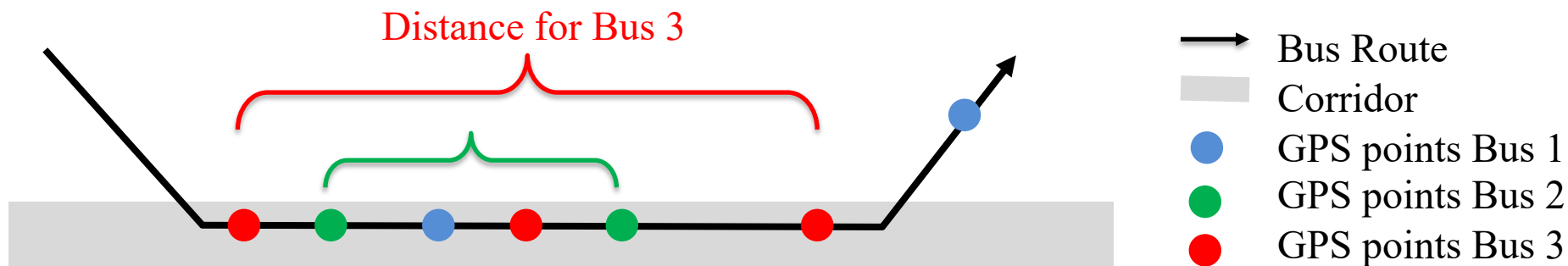
Reliability

Service Coverage

Frequency

Metrics: Transit Speed on Corridors

- Speed estimated using AVL data
 - GPS points (location & time stamp) for all buses
- Average speed through the corridor
 - Difference in time stamps over distance
 - Distance is corridor length covered by bus trajectory
- Challenges:
 - GPS points are provided every 1-2 minutes
 - The results may not be representative of the entire corridor
 - Different routes cover different corridor segments
 - Dwell times are included in travel time



Metrics: Transit Speed on Corridors

1. Choose Analysis Type

Corridor Summary Traffic Volume Speed Travel Time Transit

Analysis Type

☐ Not Selected

☐ Buses and Alightings

☐ Dwell Time

☒ Transit Speed

☐ Occupancy

Choose Period 1

2017-01-08 to 2017-02-15

Choose Period 2

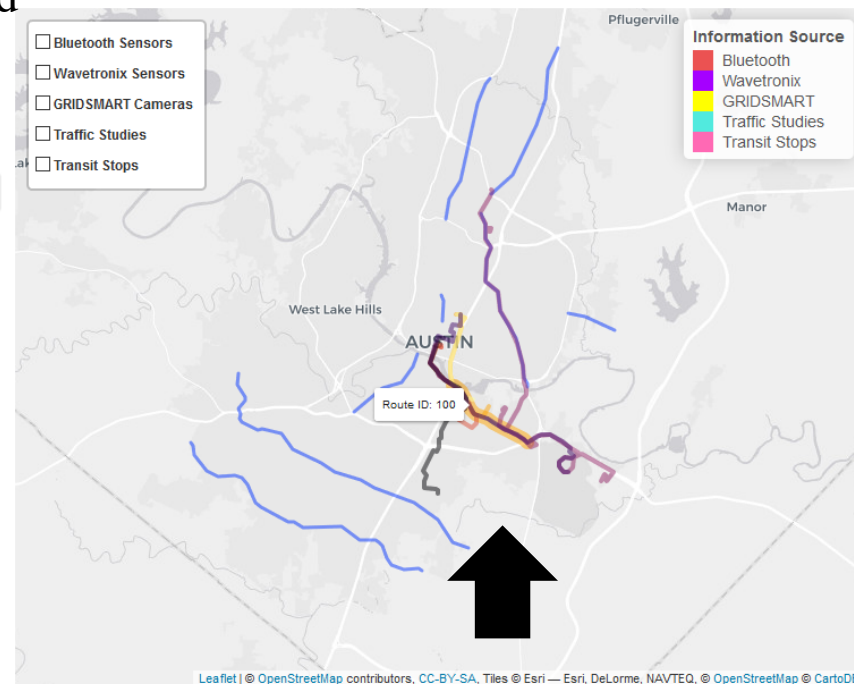
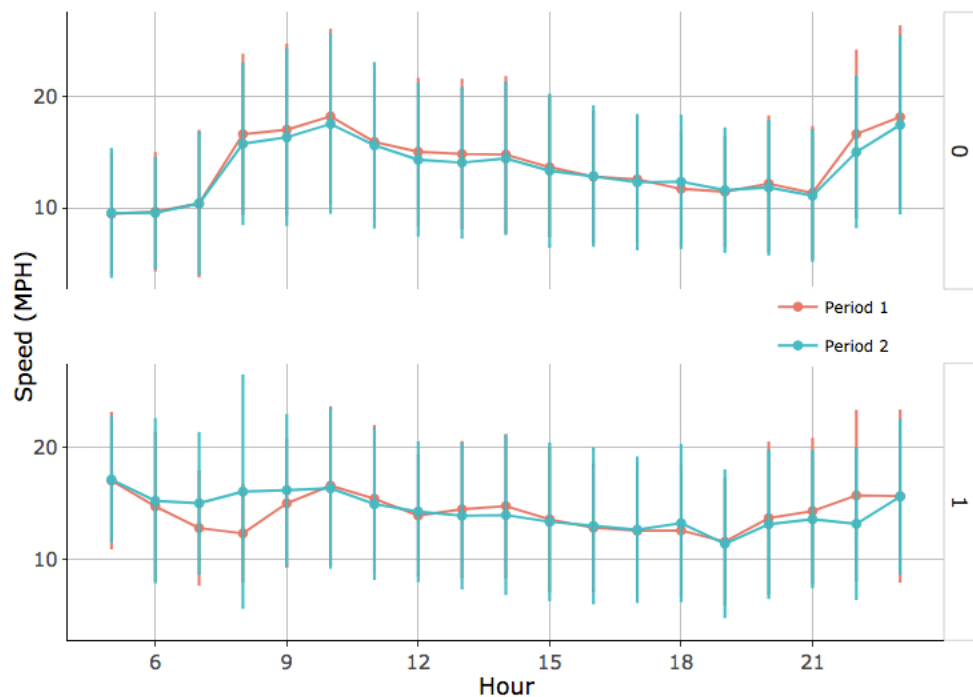
2017-04-02 to 2017-06-03

2. Select Dates and Corridor

Choose a corridor

E. Riverside

Transit Average Speed by Time of Day and Direction



3. Visualize Transit Routes Serving Corridor for Analysis

4. Summarize Transit Speed Estimate by Hour and Direction

Metrics: Occupancy

1. Choose Analysis Type

Corridor Summary Traffic Volume Speed Travel Time Transit

Analysis Type

- ☐ Selected
- ☐ Stops and Alightings
- ☐ Time
- ☐ Travel Speed
- ☒ Occupancy

Choose Period 1

2017-01-08 to 2017-02-15

Choose Period 2

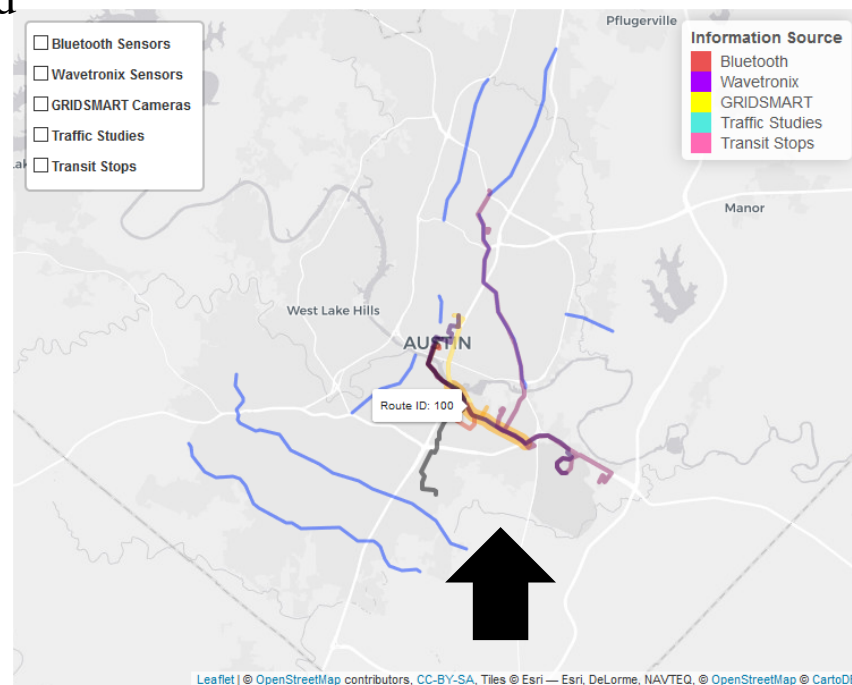
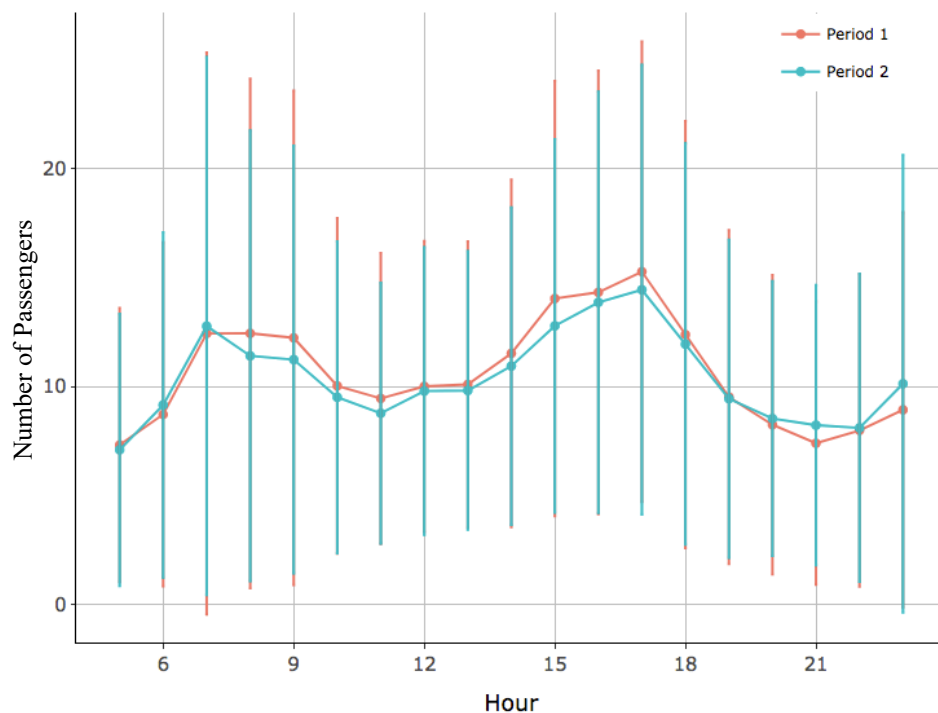
2017-04-02 to 2017-06-03

2. Select Dates and Corridor

Choose a corridor

E. Riverside

Transit Average Occupancy by Hour



3. Visualize Transit Routes Serving Corridor for Analysis

4. Summarize Transit Occupancy by Hour

Metrics: Boardings and Alightings

1. Choose Analysis Type

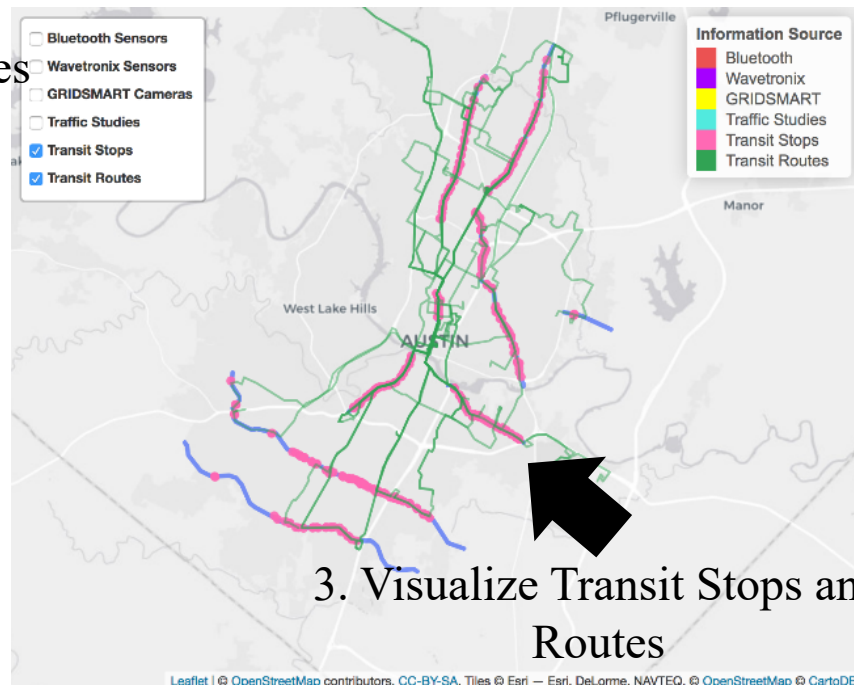
Corridor Summary Traffic Volume Speed Travel Time **Transit**

- Analysis Type
- ☐ Not Selected
 - ☒ Boardings and Alightings
 - ☐ Dwell Time
 - ☐ Transit Speed
 - ☐ Occupancy

2. Select Dates

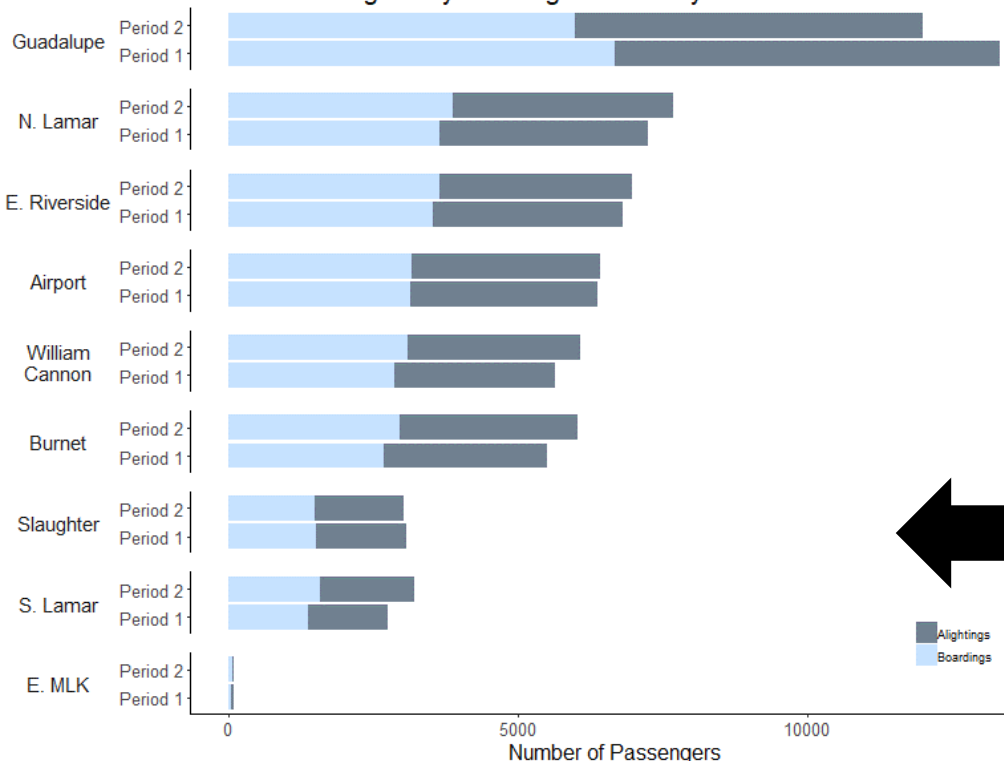
Choose Period 1
2017-01-08 to 2017-02-15

Choose Period 2
2017-04-02 to 2017-06-03



3. Visualize Transit Stops and Routes

Average Daily Passenger Counts by Corridor and Period



4. Summarize Passenger Counts (not normalized by number of stops)

Metrics: Dwell Time

Corridor Summary

Traffic Volume

Speed

Travel Time

Transit

Analysis Type

- ☐ Unselected
- ☐ Boardings and Alightings
- ☒ Dwell Time
- ☐ Transit Speed
- ☐ Occupancy

Choose Period 1

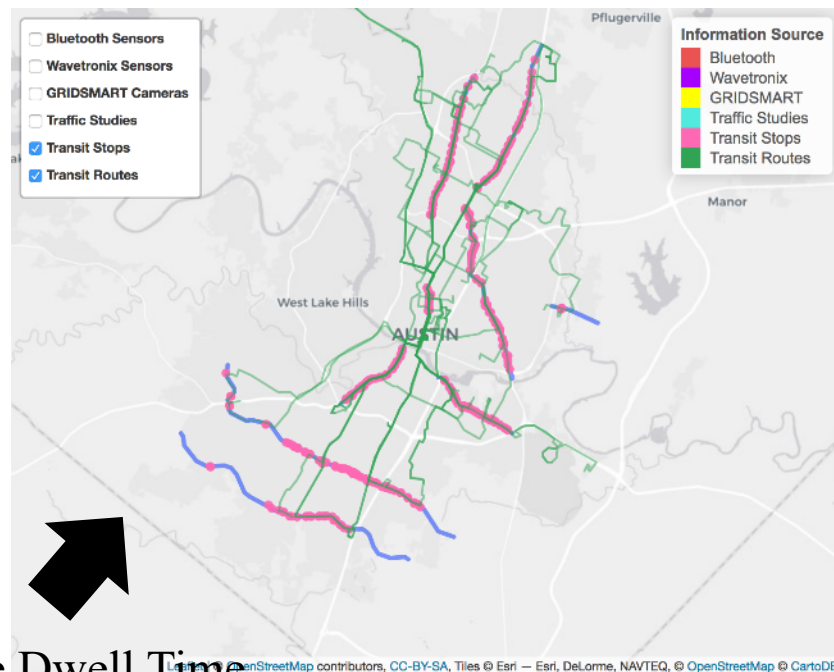
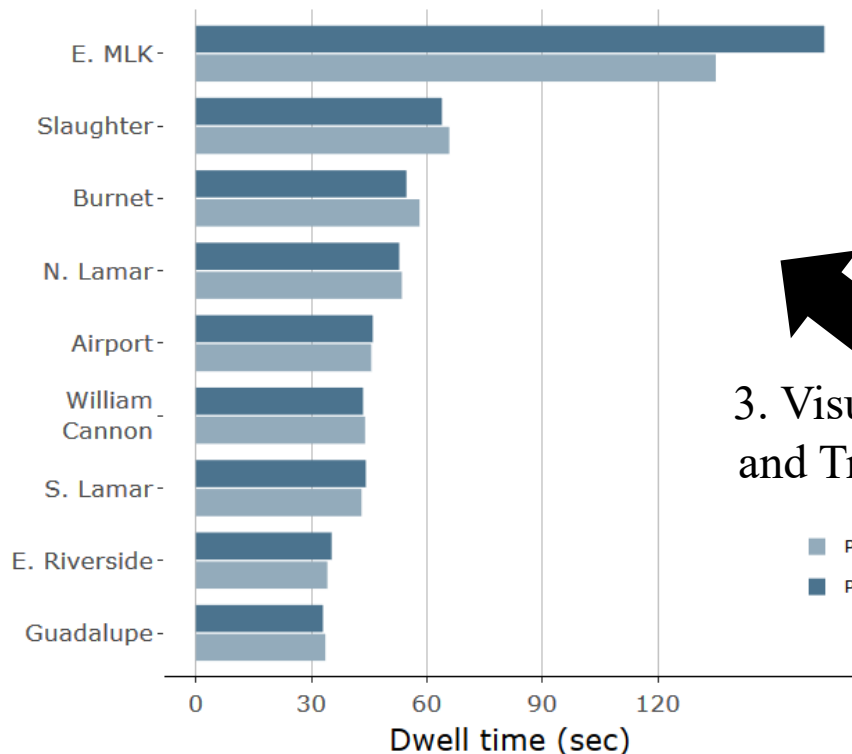
2017-01-08 to 2017-02-15

Choose Period 2

2017-04-02 to 2017-06-03

2. Select Dates

Average Dwell Time per Stop by Corridor and Period



3. Visualize Dwell Time and Transit Information

Period 1
Period 2

Future Work

- Estimate bus trajectory
 - Integrate AVL and APC
 - Update speed estimation
- Estimate bus on-time performance
 - Integrate GTFS and APC



THANKS

Questions or Comments?

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