

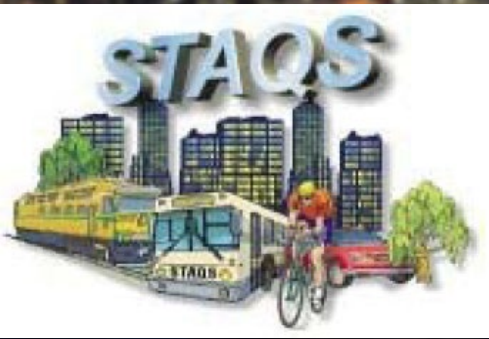


**Ohio • Kentucky • Indiana**  
*Regional Council of Governments*

# Better Data for Forecasting Transportation Air Quality Impacts


STAQS


August 20, 2019



[www.oki.org](http://www.oki.org)

 [/okiregional](https://www.facebook.com/okiregional)

 [/okircog](https://twitter.com/okircog)

 [/okircog](https://www.youtube.com/okircog)

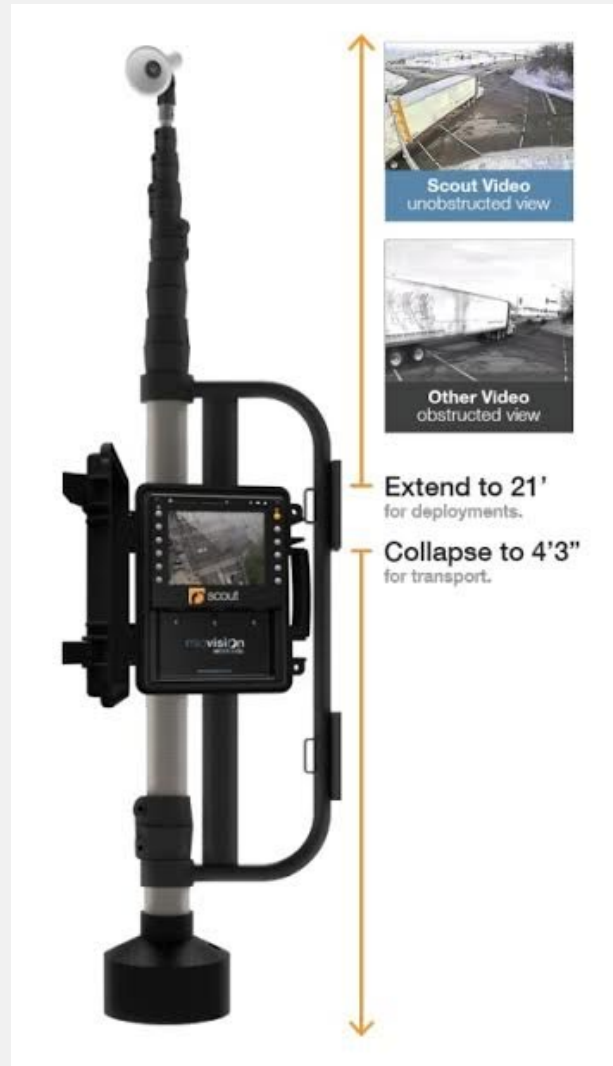
# Data for Travel Model Validation and Improvement

- MioVision - Turning movements at congested intersections
- INRIX – travel speeds
- Ohio River bridges traffic counts
- Census Transportation Planning Pack
- Streetlight
- ATRI Truck Data
- Uber Mobility

# MIOVISION Intersection Analysis

#	Intersection	County	Jurisdiction
1	SR32 @ Glen Este-Withamsville	Clermont	Union Township
2	US 50 @ SR 131	Clermont	City of Milford
3	Columbia Pkwy @ Delta Ave	Hamilton	City of Cincinnati
4	Montgomery Rd @ Kenwood Rd.	Hamilton	Sycamore Township
5	US 42 @ Galbraith Rd.	Hamilton	City of Reading
6	SR 747 @ Kemper Rd.	Hamilton	City of Springdale
7	Beechmont Ave @ Five Mile Road	Hamilton	Anderson Township
8	Mason-Montgomery @ Tylersville Rd.	Warren	City of Mason
9	SR 4 @ By-Pass 4	Butler	City of Fairfield
10	SR 4 @ Muhlhauser Rd.	Butler	City of Fairfield
11	SR 4 @ SR 129	Butler	City of Hamilton
12	SR 747 @ Muhlhauser Rd.	Butler	West Chester Township
13	US 50 @ IN 350	Dearborn	City of Aurora
14	US 50 @ SR 1 (Bellevue)	Dearborn	City of Greendale
15	US 25 @ KY 536	Boone	Boone County
16	US 42 @ KY 842	Boone	City of Florence
17	KY 18 @ KY 842	Boone	City of Florence
18	US 27 @ I-471	Campbell	City of Fort Thomas / City of Southgate
19	KY 17 @ KY 1072	Kenton	City of Fort Wright

# MIOVISION



[www.oki.org](http://www.oki.org)



[/okiregional](https://www.facebook.com/okiregional)



[/okircog](https://twitter.com/okircog)





# MIOVISION – KY 18 @ Mall Rd.

[MioVision video June2019](#)

[www.oki.org](http://www.oki.org)



[/okiregional](#)



[/okircog](#)



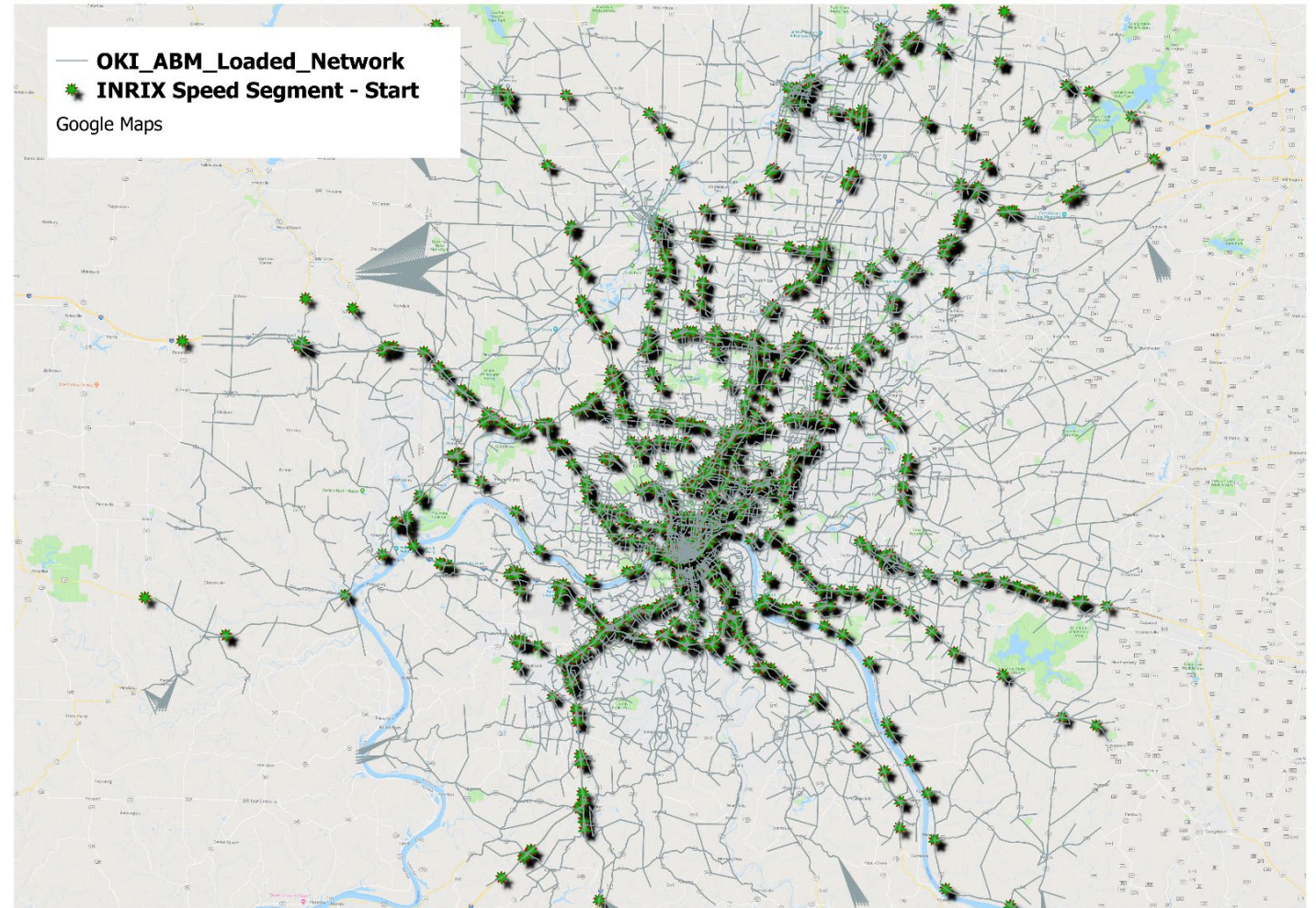
# INRIX Travel Time Data

## Data source

- Regional Integrated Transportation Information System (<https://ritis.org/>)
- National Performance Management Research Data Set (<https://npmrds.ritis.org/>)
  - ✓ Monthly archive of average travel times, reported every 5 minutes when data is available
  - ✓ Travel times are based on vehicle probe-data data
  - ✓ Average travel times have been collected monthly since July 2013
  - ✓ INRIX travel time data is available from January 2017

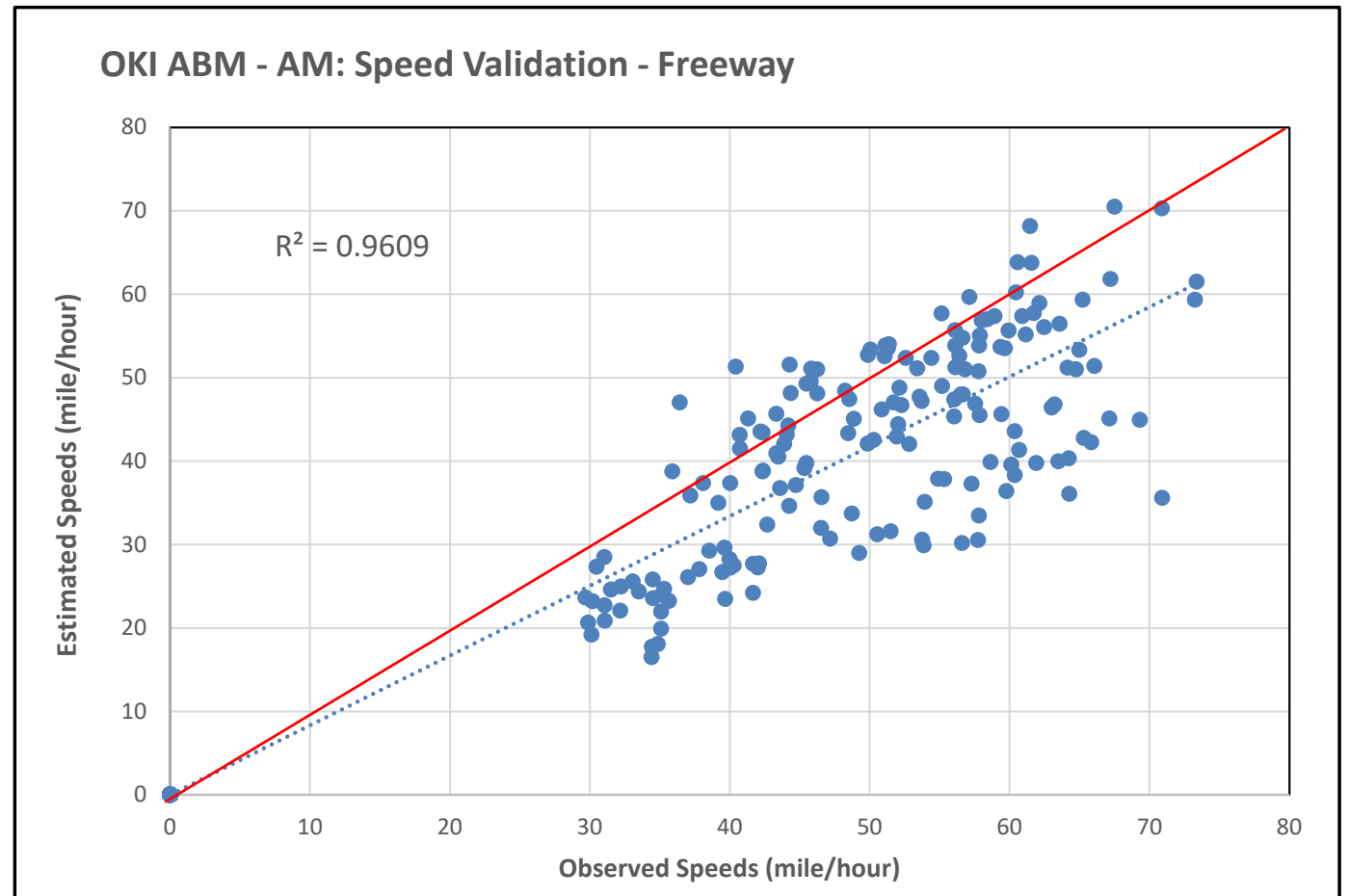
# TMC Code to Model Highway Network Link

- INRIX travel times are reported by roadway segments which are identified by Traffic Message Channel Code
- NPMRDS Traffic Message Channel Codes are linked to model highway network link based on the road segment start points



# Model Speed Validation

- INRIX speeds are averaged by Time-of-Day (AM, MD, PM, NT)
- Model speeds are validated against the observed speeds for each time period and by facility types





# Ohio River Bridge Radar Count Sta

- 24/7 Vehicle Counts and Speeds at 7 Ohio River Bridges
- Equipment
  - Side-Fire Radar
  - Software
  - Modems
- Five Vehicle Classifications
- \$300,000 Installation (OKI-STBG funds)
- \$25,000 budget for yearly maintenance



# ORBCS Locations

- I-71/75 (Brent Spence) Northbound and Southbound
- I-275 (Carroll Cropper) Eastbound and Westbound
- I-275 (Combs-Hehl) Northbound and Southbound
- I-471 (Dan Beard) Northbound and Southbound
- US 25/US 42/US127 (Clay Wade Bailey)
- KY 17 (Roebeling)
- US 27 (Taylor Southgate)



# ORBCS



[www.oki.org](http://www.oki.org)



/okiregional



/okircog



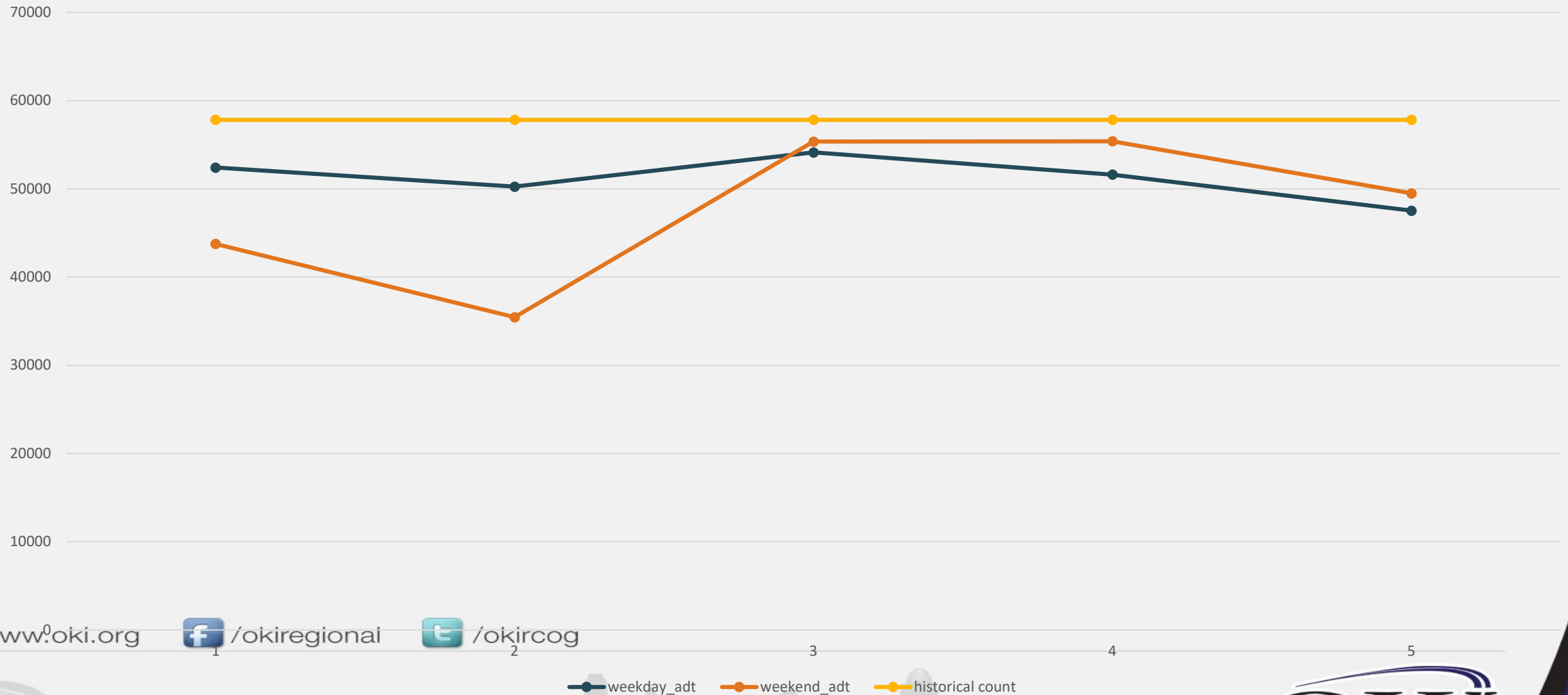
# ORBCS Vehicle Classifications

1. Motorcycles
2. Passenger Cars
3. Small Trucks (2-axles)
4. Large Trucks (Single-Trailer)
5. Large Trucks (Multi-Trailer)



# ORBCS

dan\_beard\_sb\_monthly\_adt



# Census Transportation Planning Products

## ❖ About Census Transportation Planning Products Programs (CTPP)

- State DOT-funded, cooperative program
- Produces special tabulations of Census Bureau's American Community Survey (ACS) data for transportation planning, analysis, and strategic direction.
- More about the CTPP can be found at the CTPP homepage <https://ctpp.transportation.org/>.

## ❖ CTPP data include

- Demographic characteristics at the residence
- Demographic characteristics at the workplace
- Journey to work (JTW) travel flows

## ❖ CTPP data versions

- The latest data is 2012-2016 5-Year CTPP based on 2012-2016 ACS, which is available at <http://data5.ctpp.transportation.org/ctpp1216/Browse/browsetables.aspx>.
- Older versions include 2006-2010 5-Year CTPP, 2000 CTPP, and 1990 CTPP.

# CTPP Data Format

## ❖ 2012-2016 CTPP data tabulations (198 tables in total)

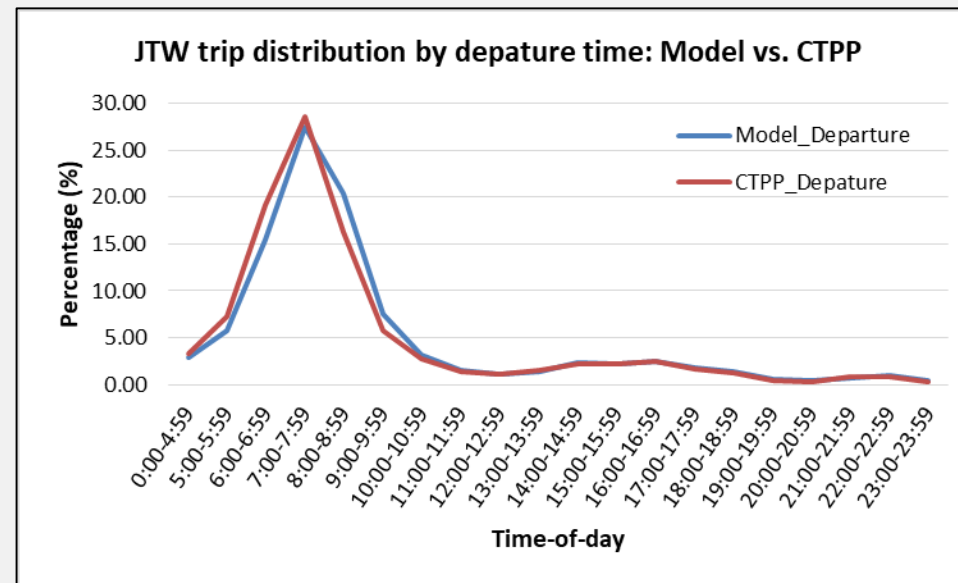
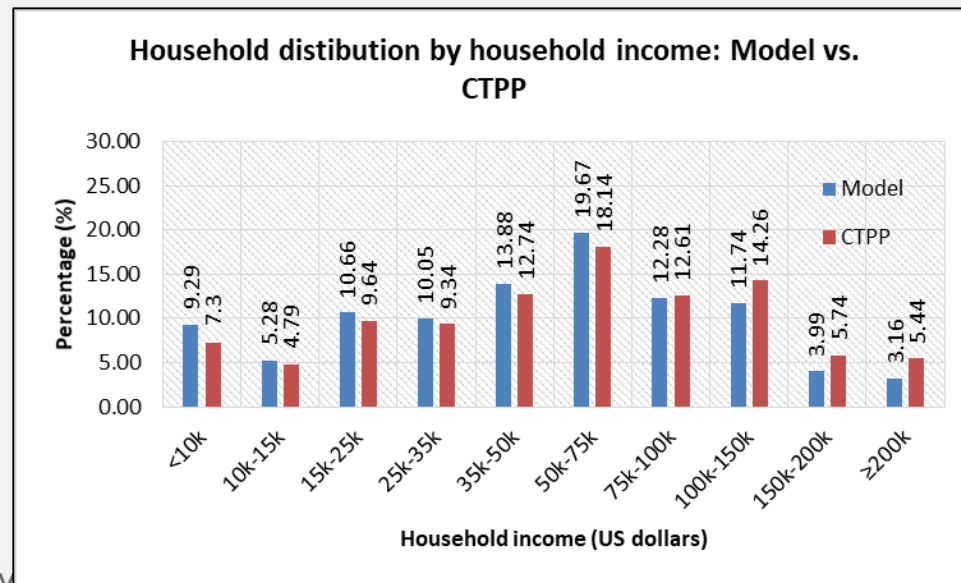
- 116 residence-based tables: Household and personal characteristics, travel mode, travel time, and departure time at the residence
- 57 workplace-based tables: Industry and occupation, travel mode, travel time, and arrival time at the workplace (57 tables)
- 25 flow tables: Flows of the home-to-work commute

## ❖ 2012-2016 CTPP available geographies

- Nation
- State
- County
- Minor Civil Division (MCD)
- Place
- Public Use Microdata Area (PUMA)
- Metropolitan Statistical Area (MSA)
- Census Tract
- Traffic Analysis District (TAD)
- Traffic Analysis Zone (TAZ)

# CTPP Data Applications for Model Validation

- ❖ Validate population synthesis such as household distribution by income and car ownership and population distribution by age, gender, ...
- ❖ Validate the Journey to Work (Home Based Work Trip) flow:
  - Departure time distribution
  - Destination choice
  - Mode choice



Note: The household and trip distributions from the model are not the final results. They are only examples here to illustrate the application of CTPP data in travel demand model validation.



# StreetLight Origin-Destination Data

❖ Origin-Destination information derived from big samples:

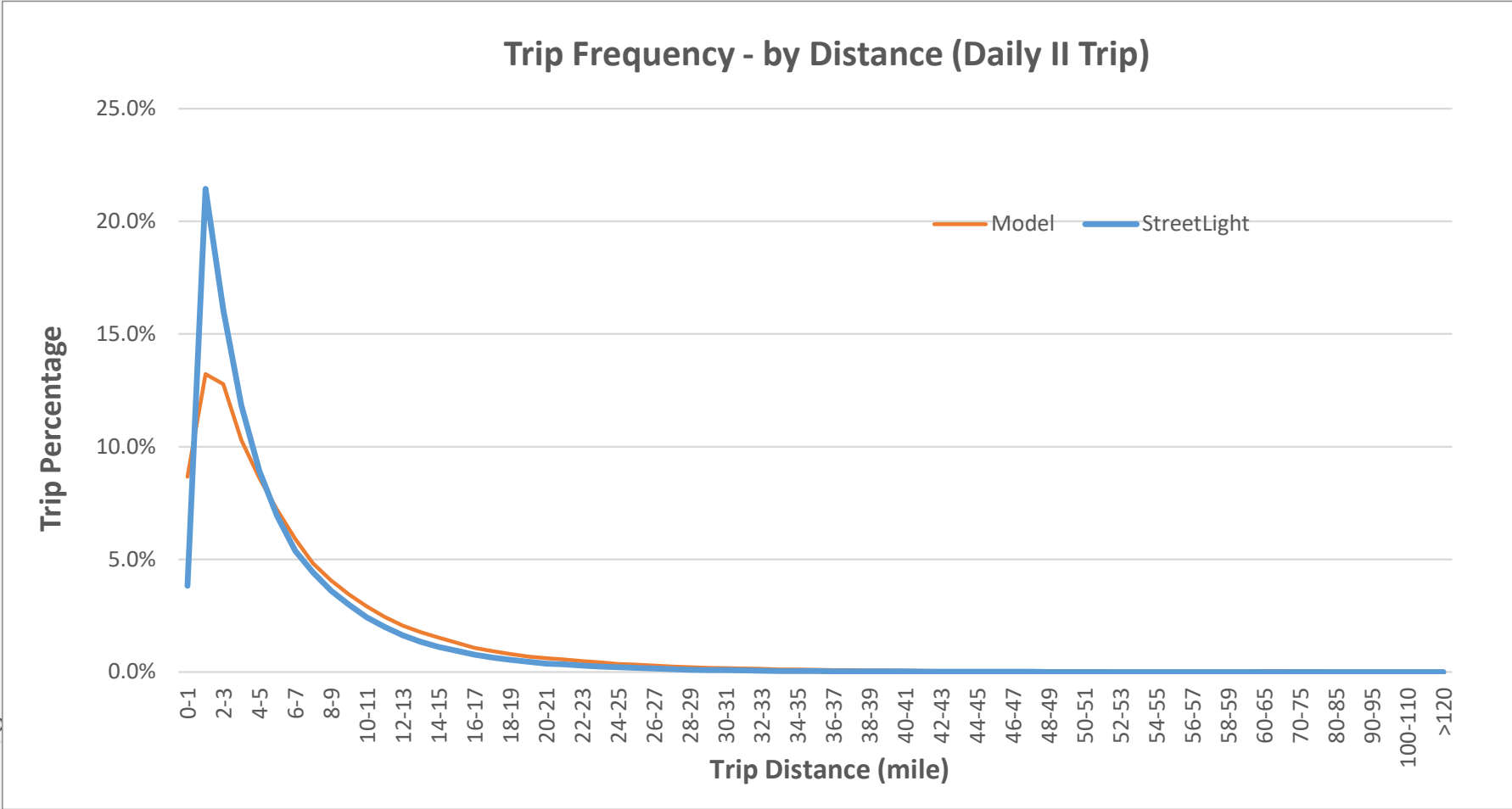
- Auto location records from smart phones
- Truck location records from navigation devices (GPS)

Weekday County to County Auto Trip Flow within OKI Region based on StreetLight May 2016 Data:

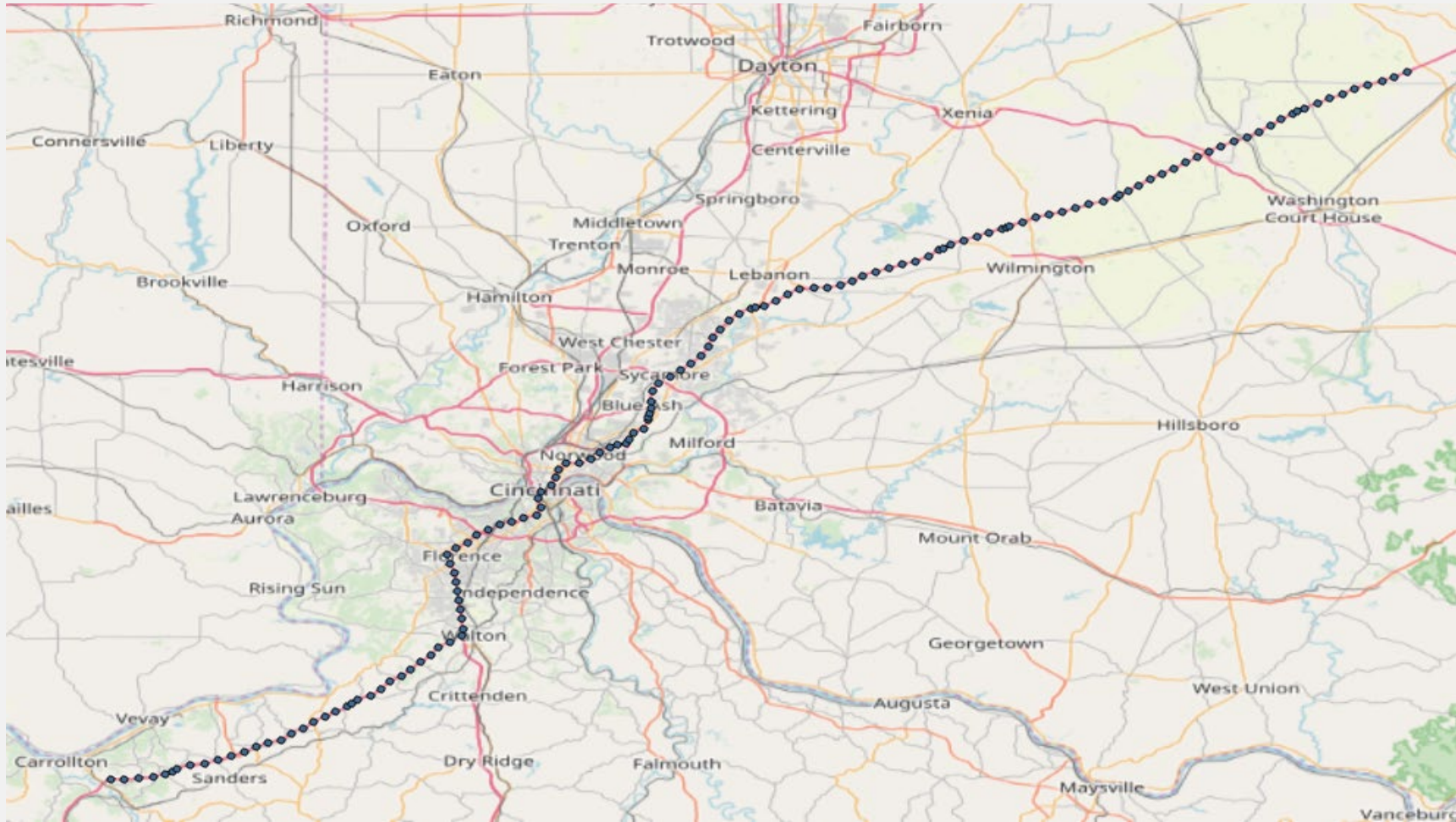
County (From/To)	HAM	BUT	WAR	CLE	CAM	KEN	BOO	DEA	MOT	MIA	GRE	Ext	Total
HAM	24.3%	1.8%	0.8%	1.1%	0.5%	0.5%	0.2%	0.2%	0.1%	0.0%	0.0%	0.7%	30.3%
BUT	1.8%	8.2%	1.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.3%	11.7%
WAR	0.8%	1.0%	3.9%	0.2%	0.0%	0.0%	0.0%	0.0%	0.5%	0.0%	0.1%	0.2%	6.8%
CLE	1.1%	0.1%	0.2%	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	5.4%
CAM	0.5%	0.0%	0.0%	0.0%	1.5%	0.5%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	2.7%
KEN	0.5%	0.0%	0.0%	0.0%	0.5%	2.8%	0.9%	0.0%	0.0%	0.0%	0.0%	0.1%	4.9%
BOO	0.2%	0.0%	0.0%	0.0%	0.1%	0.9%	3.5%	0.0%	0.0%	0.0%	0.0%	0.2%	4.9%
DEA	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.1%	1.1%
MOT	0.1%	0.2%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	16.7%	0.4%	1.7%	0.6%	20.3%
MIA	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	2.2%	0.0%	0.2%	2.9%
GRE	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%	0.0%	3.2%	0.2%	5.3%
Ext	0.7%	0.3%	0.2%	0.2%	0.1%	0.1%	0.2%	0.1%	0.6%	0.2%	0.2%	1.0%	3.8%
Total	30.3%	11.7%	6.8%	5.4%	2.7%	4.9%	4.9%	1.1%	20.2%	2.9%	5.3%	3.8%	100.0%

# StreetLight Origin-Destination Data

StreetLight Trip (Auto) Length Distribution with OKI Region:



# ATRI Freight Monitoring



[www.oki.org](http://www.oki.org)



/okiregional

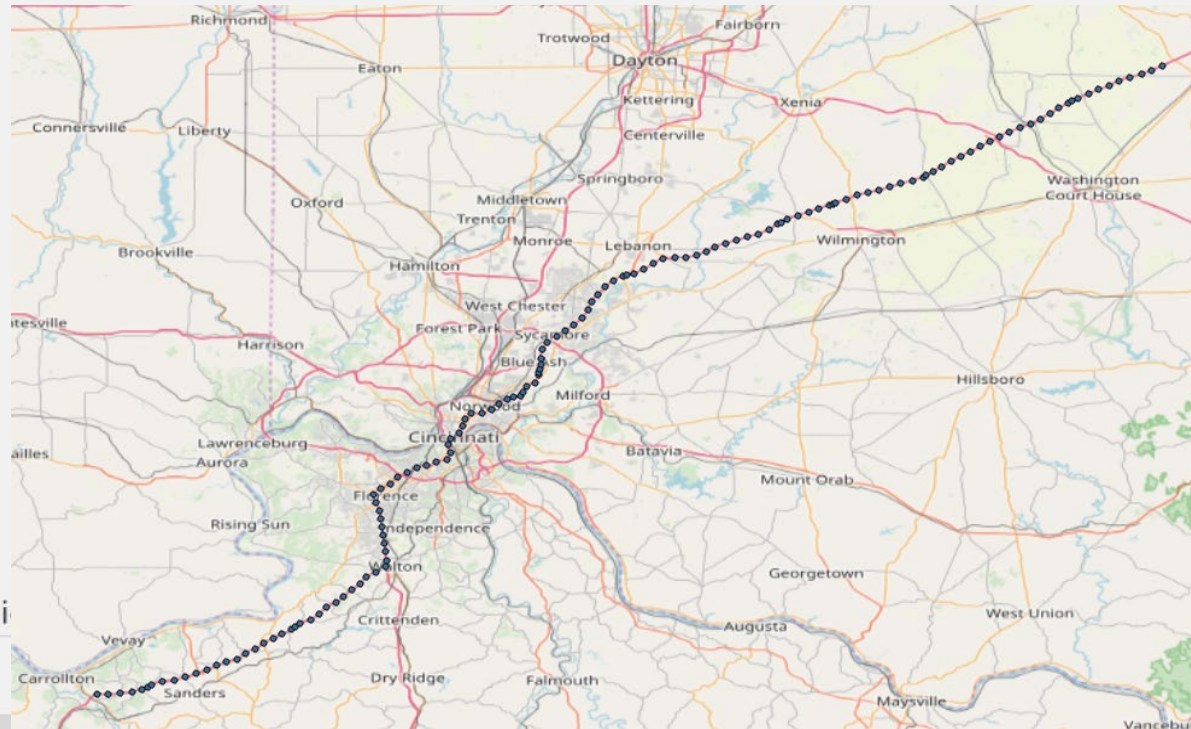


/okircog



# ATRI Freight Monitoring

- Truck GPS tracking
- OKI developing algorithms and procedures to convert raw GPS data into truck trip database
- OKI developing O-D truck table to validate/calibrate truck model components of regional travel demand model.





# Uber Movement



## Datasets Utilized



Travel Times



Speeds



New Mobility

City officials, transportation planners & consultants rely on easily accessible data and tools to work with in order to generate insights for operational and strategic planning.

**“The Uber Movement Speeds initiative addresses the increasing vulnerability of pedestrians and cyclists as they interact with cars and trucks. It does this by providing an invaluable metric for evaluating traffic safety to local governments. It is our unshakable belief that the OKI-Uber Movement Speeds partnership will reduce injuries and save lives.”**



Mark Policinski, CEO, Ohio-Kentucky-Indiana Council of Governments

## City planners can:

- ✓ Identify and measure congestion in their jurisdictions
- ✓ Calibrate and validate travel demand models
- ✓ Measure the efficacy of policies and infrastructure investments
- ✓ Build a ‘transportation scorecard’ for a city or across a region

# Movement



City

Cincinnati

Product Type

Travel Times

Zone Type

Census Tracts

Date-Time Range

10/1/2018 - 12/31/2018 (Every day, Daily Average)

This selection may be missing data from 10/25/2018 - 10/29/2018

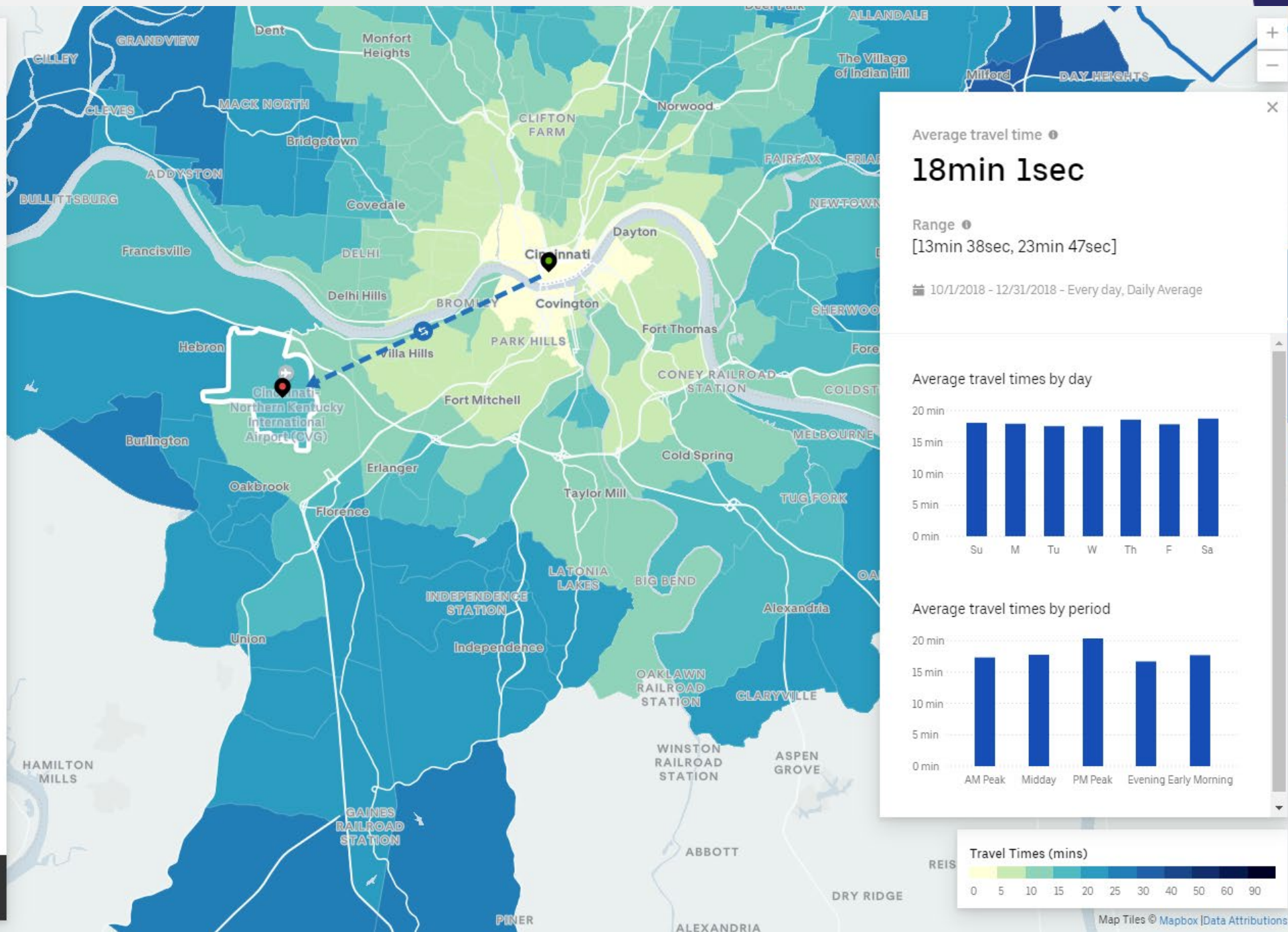
+ Add second date range to compare

Origin and Destination Zones

Second Street West, Central Business District

100 New Price Pike, Burlington

Download data



# Uber/OKI Travel Survey

- Trip Start Time
- Pick-up/drop-off locations
- # of Household vehicles
- How did you take trip before Uber
- Reasons for choosing Uber
- Trip purpose
- How did you complete other parts of your trip
- Optional: Age, income, race/ethnicity

# Contact Information

Andy Reser, AICP  
OKI Regional Council of Governments  
Transportation Programming Manager

[areser@oki.org](mailto:areser@oki.org)

513-619-7688