

RITIS Workshop

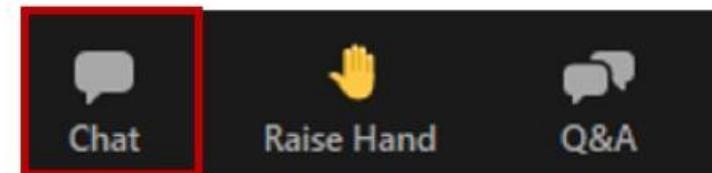
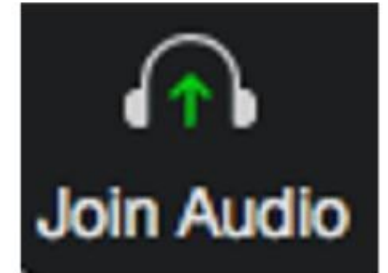
Understanding O-D Data

April 8, 2022



Welcome!

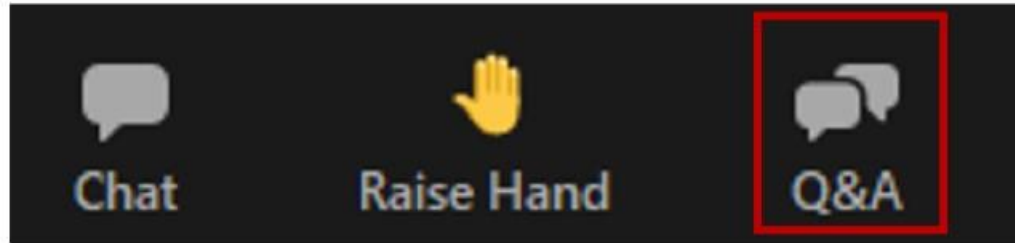
- We are using Zoom **Webinar**
- **AUDIO (Computer):** Use your computer speakers and microphone by clicking the “Join Audio” button at the bottom left of the screen. You will be muted.
- **Alternate Audio (Phone):** Call into the meeting by dialing the phone number based on your location (provided in the confirmation email) and enter the Meeting ID at the prompt. You will be muted.
- **This web meeting is being recorded.**
- **Questions** with the audio or web? Please contact Esther directly via email (ekleit@kmjinc.com)
- The **Chatbox** is not available to participants. Please use the **Q&A box** for questions to the presenters



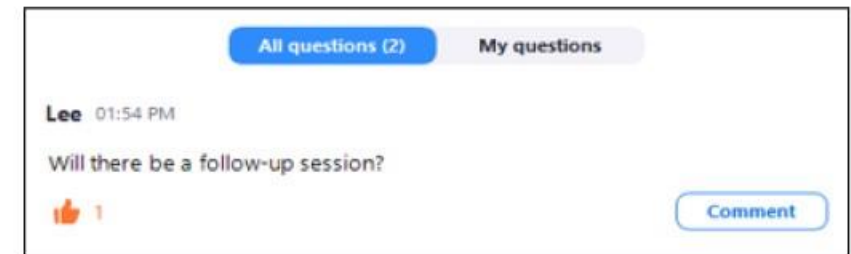
Asking Questions in the Q&A Box



- Questions will be asked in the Q&A box
- Click on the Q&A icon at the bottom of your screen



- The questions in the Q&A box will be monitored and answered either during or at the end of the workshop
- You can keep track of your questions in the “My Questions” tab in the Q&A box



Coalition Update



Denise Markow

The Eastern Transportation Coalition
TSMO Director

— **THE EASTERN
TRANSPORTATION
COALITION**

CONNECTING FOR SOLUTIONS



Who We Are

- **The Eastern Transportation Coalition (TETC)** is a partnership of 17 states and D.C. focused on **connecting public agencies across modes of travel to increase safety and efficiency.**
- In the past 25 years TETC has evolved from a small, highway-focused group to more than **200 public agencies** working together to address the pressing challenges facing the eastern corridor focusing on:
 - **Transportation Systems Management & Operations**
 - **Freight**
 - **Innovation**



W e l c o m e

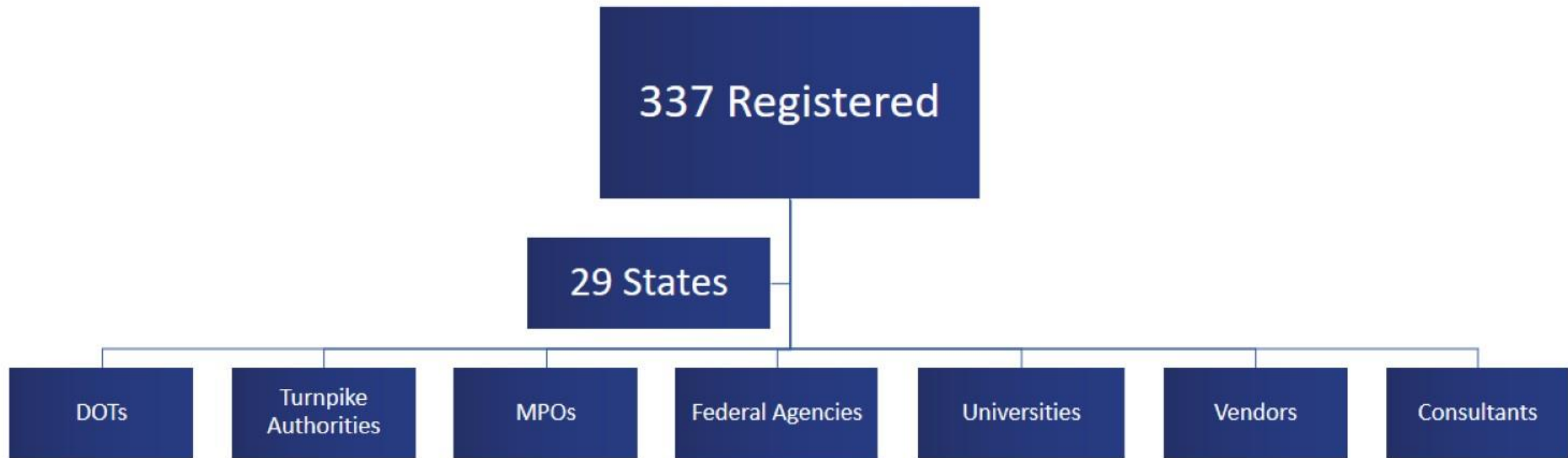


— THE EASTERN
TRANSPORTATION
COALITION

CONNECTING FOR SOLUTIONS



The Eastern Transportation Coalition Sponsored Event



Coalition Update



RECENT

- ✓ **Transportation Data Marketplace State & Vendor Meetings (33)** - August 2021 - January 2022
- ✓ **New England HOGs - Fresh Start: Freight Roundtable** - February 17, 2022
- ✓ **RITIS User Group Meeting** - February 24, 2022
- ✓ **TIS Web Summit: Improving Safety - Implementing New Travel Info Services for Commercial Vehicles** - March 17, 2022
- ✓ **RITIS Workshop: Building a Corridor Performance Summary Report** - March 29, 2022
- ✓ **RITIS Product Enhancement Working Group Web Meeting** - April 6, 2022
- ✓ **New England HOGs - Using RWIS in Winter Operations** - April 7, 2022

UPCOMING

- **Electric Vehicle Workshop** - April 12-13, 2022 (invite only)
- **FY2023 Strategic Planning** - April 21, 2022 (Committee members only)
- **Freight Committee Meeting** - April 27, 2022 (invite only)
- **RITIS User Group Meeting** - May 5, 2022
- **Potomac HOGs - Getting Better Information out to Travelers in Winter Operations** - May 11, 2022

Coalition Calender:

<https://tetcoalition.org/events-calendar-events/>



Today's Speakers



Rick Ayers
UMD CATT Lab
Public Sector Advocate



Matt Glasser
Georgia DOT
Assistant State Traffic Engineer

Setting the Stage



Matt Glasser

Assistant State Traffic Engineer, Georgia DOT

RITIS Trip Analytics – OD Overview

Professional Development for Trip Analytics

➤ Data-driven mobility insights from CATT Lab

Rick Ayers

703.989.3221

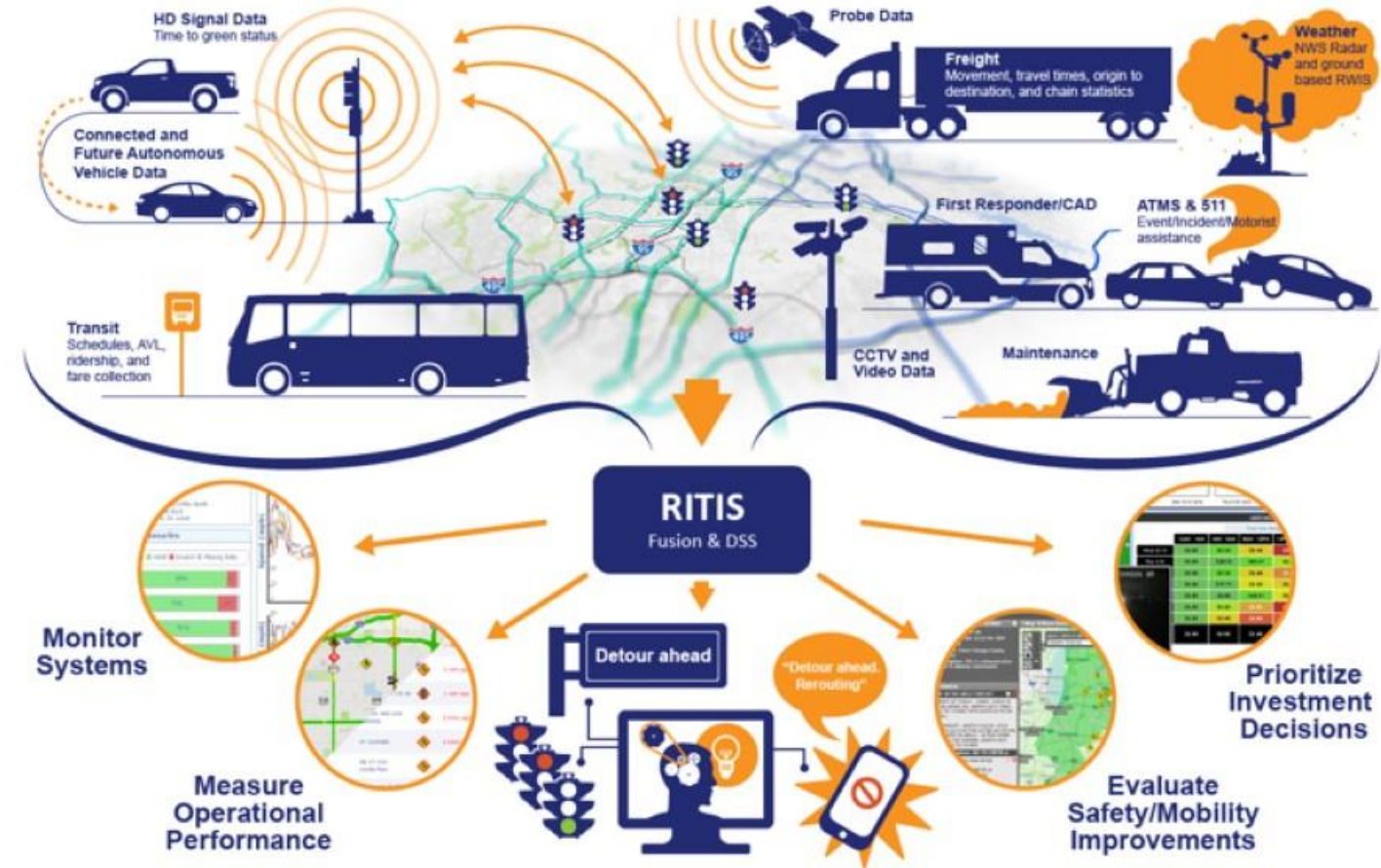
rayers@umd.edu

cattlab.umd.edu

Agenda

- Review of Data Sources
- Trip Analytics Background
- Overview of Trip Analytics v3.0
 - O/D Matrix
 - Segment Analysis
 - Route Analysis
- Trip Analytics Next Generation
- Agency Use Cases
- Use Case Examples
- Discussion and Q&A

<https://trips.ritis.org/>



<https://ritis.org>

Are you a current user of Trip Analytics from the CATT Lab?

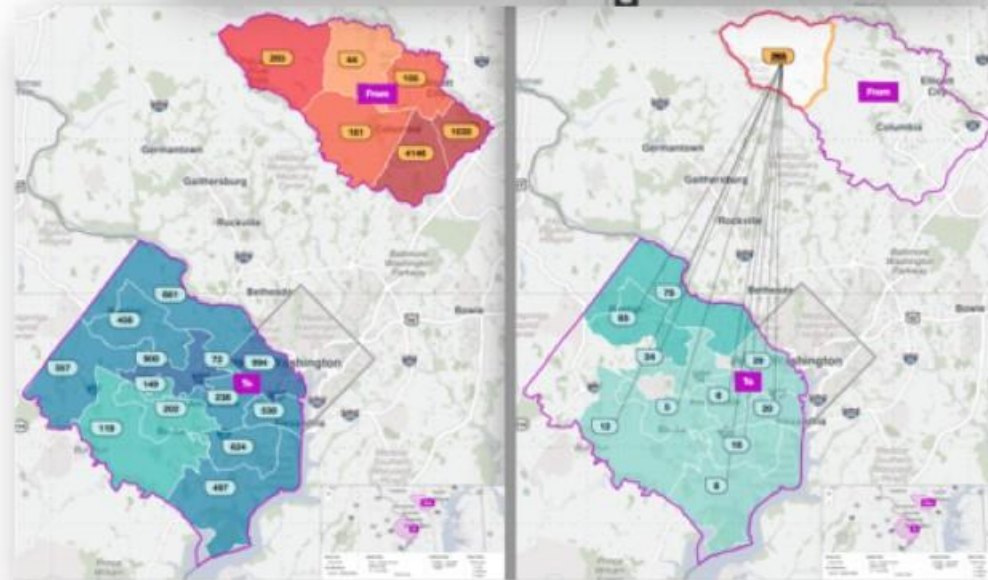
- Yes
- No
- No, however, my agency is interested in exploring Trip Analytics and related waypoint/origin-destination analytics solutions

Trip Analytics Background

- Customer and industry demand
- Need for a solution that is DATA AGNOSTIC
- Agencies need data and tools to VALIDATE assumptions or models that characterize the movement of vehicles
- Planning community desired tools to CALIBRATE their models



	# of Trips	Medium Vehicles	Heavy Vehicles	Length	Travel Time	Avg TT	Miles
Flushing Road, MD 175, Route Parkway, MD	227	194	43	51 mi	59 m	34	34
Flushing Parkway, MD 175, 96, 196, 196, Cap	190	160	30	42 mi	57 m	34	34
Flushing Parkway, MD 175, 96, 196, 196, Cap	76	62	14	41 mi	52 m	30	30
Flushing Parkway, MD 175, 96, 196, 196, Pkwy	70	70	0	37 mi	58 m	34	34
Army, Annapolis Freeway, MD 201, Kentlands, I	68	67	1	35 mi	42 m	25	25
Flushing, MD 175, 96, 196, 196, Capital Beltway, I	42	39	3	42 mi	1:4:52 m	1:4:52	42
US 1, Edgewood Road, Capital Beltway, I-95	56	54	2	39 mi	1:4:55 m	1:4:55	48
Flushing Road, MD 175, Route Parkway, MD 17	56	55	1	45 mi	50 m	31	31
Flushing, I 495, American Legion Bridge, I 495, Ar	53	51	2	38 mi	53 m	32	32
Flushing, Washington Parkway, Capital Belt	33	30	3	47 mi	55 m	37	37
	1742	1587	155				



Attendee Polling – Q2

Do you use macro-level regional demand models as part of your job function?

- Yes
- No

Attendee Polling – Q3

Do you use microsimulation models as part of your job function?

- Yes
- No

TETC - Transportation Data Marketplace (TDM)

— THE EASTERN
TRANSPORTATION
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The Coalition's Transportation Data Marketplace

The Eastern Transportation Coalition's Transportation Data Marketplace has its origins in the Vehicle Probe Project (VPP) which began in 2008 with the primary goal of providing Coalition members with the ability to acquire reliable and real-time travel time & speed data for their entire roadway network without the need for sensors and other hardware.

The Coalition's current effort, the **Transportation Data Marketplace (TDM)**, is providing members the opportunity to select from a host of prequalified vendors to provide data in six different categories including *Travel Time & Speed*, *Origin-Destination*, *Freight*, *Waypoint*, *Volume*, and *Conflation*.

TRANSPORTATION DATA MARKETPLACE



AirSage
Geotab
INRIX
Streetlight

Origin Destination data is closely associated with Waypoint Data, but includes only end points, and information related to the endpoints that reveal trip purpose. O-D data is derived from Waypoint data that is scalable, timely and statistically representative to provide trip data for various agency needs. Similar to Waypoint data, O-D data is provided in a manner to protect privacy, and is a great asset for planning, behavioral, and before & after studies.



Geotab
INRIX
Qinetica
Streetlight

A variety of **Freight** related data is being provided including: Travel Time, Speed and Volume data (as well as reliability), Origin and Destination information for long-haul and regional fleets, and parking data including availability and utilization. In addition, commodity movement is also being provided. This will enable broader understanding of freight movement.



AirSage
INRIX
Stellar
Wejo

Waypoint data or GPS latitude data is collected either through connected vehicle technology or location-based services. Data is provided in such a way to protect privacy (such as the obfuscation of home/work info and aggregated to census boundaries), and supports in-depth analysis such as traffic signal performance.

Attendee Polling – Q4

Is there O-D and/or waypoint data that your agency is currently evaluating that you would like the CATT Lab to integrate into Trip Analytics?

(Select all that apply)

- Airsage
- Future Mobility Labs
- Geotab
- INRIX
- National Household Transportation Study
- Streetlight
- Wejo
- Other (share in Q&A box as follows "Q2 – The waypoint/OD data I'm interested in is [])

Use Cases for Trip Analytics with OD/Waypoint Data



OPERATIONS

- Planning detours or reacting to emergencies
- Assess traffic impacts from a pandemic or related natural event
- Planning for maintenance-of-traffic (MOT) through planned work zones
- Before and after studies
- Evaluating impacts of signal re-timings
- Evaluating detour routes for events/crashes
- Evaluating evacuations (before, during, and after)
- Evaluating impacts of road closures, crashes, etc.
- Respond to public and/or elected officials in support of inquiries regarding (congestion bottlenecks, trucks cutting through



PLANNING

- Evaluating impacts of tolling
- Travel demand model calibration
- Travel time reliability studies
- Respond to public and/or elected officials in support of inquiries regarding (congestion bottlenecks, trucks cutting through neighborhoods, etc.)
- Select-link analysis
- Identifying freight hotspots
- Needs Assessments (where should I build a bridge, toll road, etc.)
- Tolling assessment
- Validate planning models
- Assessing demand for inter (and intra) city transit and/or park-and-ride lots

Attendee Polling – Q5

Which of the following operational use cases applies to you and how you support your agency? (Select all that apply)

- Planning detours or reacting to (or contingency planning for) emergencies
- Assess traffic impacts from a pandemic or related natural event
- Planning for maintenance-of-traffic (MOT) through planned work zones
- Before and after studies (project assessments for both operations and construction projects)
- Evaluating impacts of signal re-timings
- Evaluating detour routes for events/crashes
- Evaluating evacuations (before, during, and after)
- Evaluating impacts of road closures, crashes, etc.
- Respond to public and/or elected officials in support of inquiries regarding (congestion bottlenecks, trucks cutting through neighborhoods, etc.)
- Other (share in Q&A box as follows "Q5 – An additional operational use case of interest is [])

Attendee Polling – Q6

Which of the following planning use cases may apply to you and how you support your agency? (select all that apply)

- Evaluating impacts of tolling
- Travel demand model calibration
- Travel time reliability studies
- Respond to public and/or elected officials in support of inquiries regarding (congestion bottlenecks, trucks cutting through neighborhoods, etc.)
- Select-link analysis
- Identifying freight hotspots
- Needs Assessments (where should I build a bridge, toll road, etc.)
- Tolling assessment
- Assessing demand for inter (and intra) city transit and/or park-and-ride lots
- Other (share in Q&A box as follows "Q6 – An additional planning use case of interest is [])

RITIS – Enterprise Transportation Solutions

RITIS

The screenshot shows the RITIS Tool Catalog website. At the top, there is a navigation bar with the RITIS logo and links for INTRODUCTION, TOOL CATALOG (which is highlighted), USE CASES, GET ACCESS, TUTORIALS, and LOG OUT. Below the navigation bar is the title "RITIS Tool Catalog". A horizontal menu contains icons for ALL TOOLS, OPERATIONS, PLANNING, RESEARCH, DEVELOPER RESOURCES, TRAVELER INFORMATION, and OTHER. The main content area is titled "All Tools" and displays a grid of 48 tool icons. Each icon is accompanied by a small text label. A yellow rectangular box highlights three icons in the bottom row of the grid: "RITIS ANALYTICS - TRIP ANALYTICS", "RITIS ANALYTICS - INCIDENT ANALYTICS", and "RITIS ANALYTICS - ROUTE ANALYTICS".

CATT
LABORATORY

Trip and Travel Pattern Insights



Origin Destination Matrix



Segment/Link Analysis



Route Analysis



Foundational Source Data –

100 million+ trips per day in the US - Multiple Types - All GPS Based (high frequency)

➤ Data Types:

- Consumers/Mobile Phones
- Connected Vehicles
- Local Fleets (service, delivery, etc.)
- Long Haul Trucks

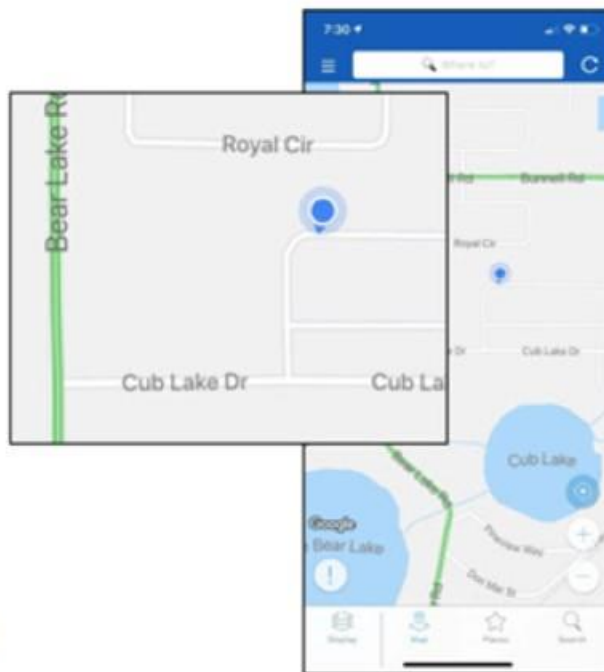
➤ Core Source Data Elements:

- Device/Trip ID
- Location
- Heading
- Speed

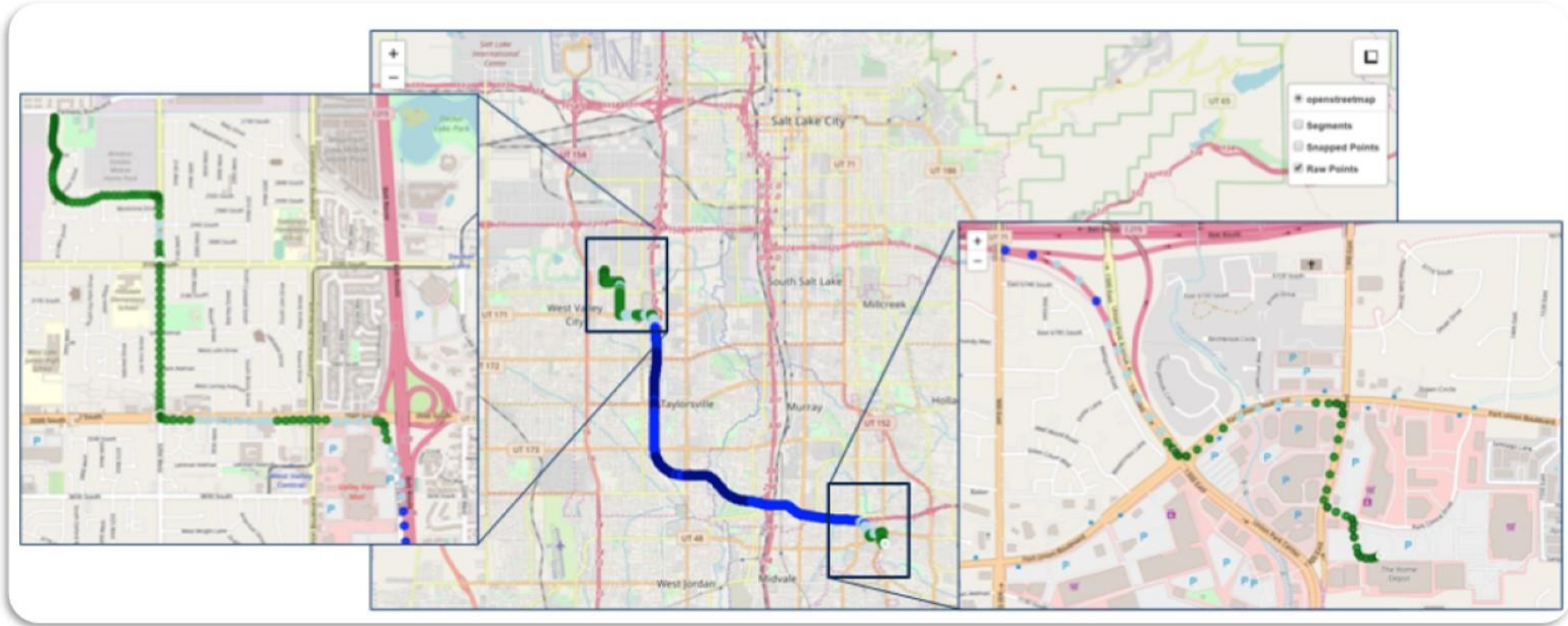
➤ Data represents nearly **15%** of all US trips

➤ **All Output Data Can be Downloaded for**

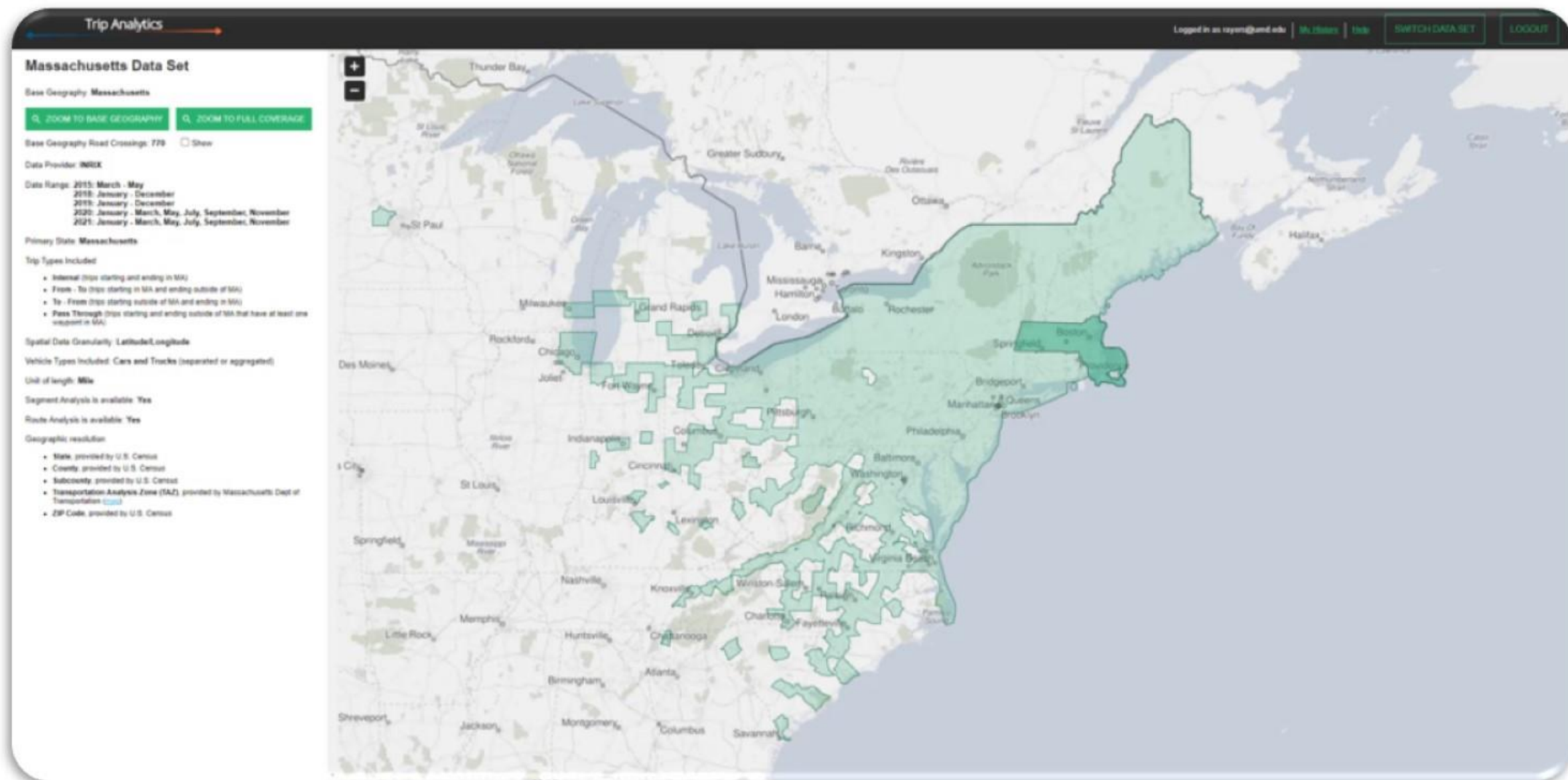
Further Analysis



Consumer Trip Example – (South Salt Lake City, Utah)



Geographic Extent of Trips



Trip and Travel Pattern Insights – Trip Analytics 3.0



OD MATRIX

Set up an Origin-Destination matrix by choosing geographies and dates available

START



SEGMENT ANALYSIS

Analyze the different origins and destinations of trips that passed through selected road segments

START



ROUTE ANALYSIS

Analyze the routes between different geographies during different dates and time periods

START

Trip and Travel Pattern Insights – Trip Analytics 3.0



OD MATRIX

Set up an Origin-Destination matrix by choosing geographies and dates available

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SEGMENT ANALYSIS

Analyze the different origins and destinations of trips that passed through selected road segments

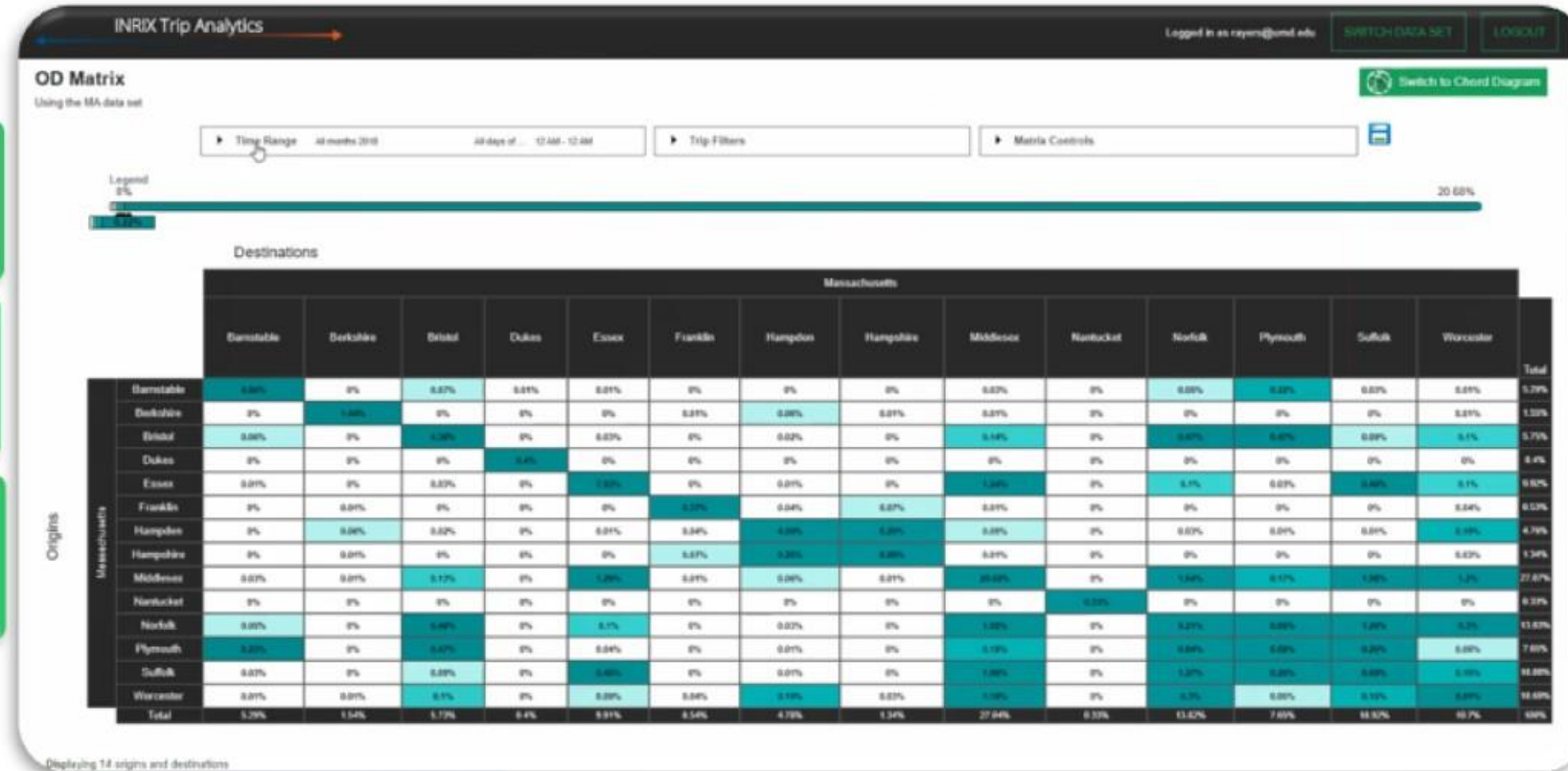
START



ROUTE ANALYSIS

Analyze the routes between different geographies during different dates and time periods

START



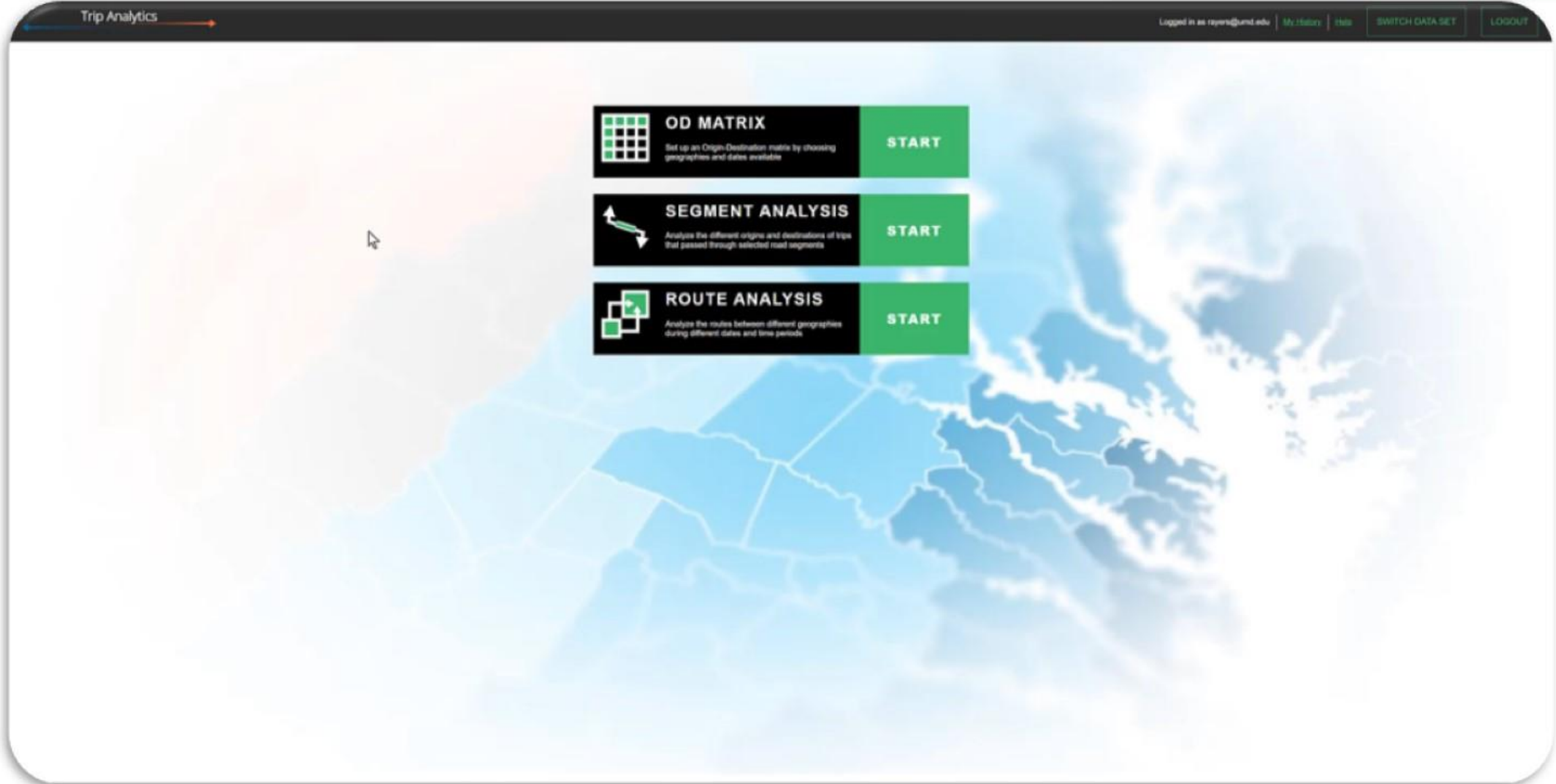
Trip Analytics 3.0


 **OD MATRIX**
Set up an Origin-Destination matrix by choosing geographies and dates available

START


Trip Analytics

Logged in as rajens@umd.edu | My history | this | SWITCH DATA SET | LOGOUT




 **OD MATRIX**
Set up an Origin-Destination matrix by choosing geographies and dates available

START

 **SEGMENT ANALYSIS**
Analyze the different origins and destinations of trips that passed through selected road segments

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Trip and Travel Pattern Insights – Trip Analytics 3.0



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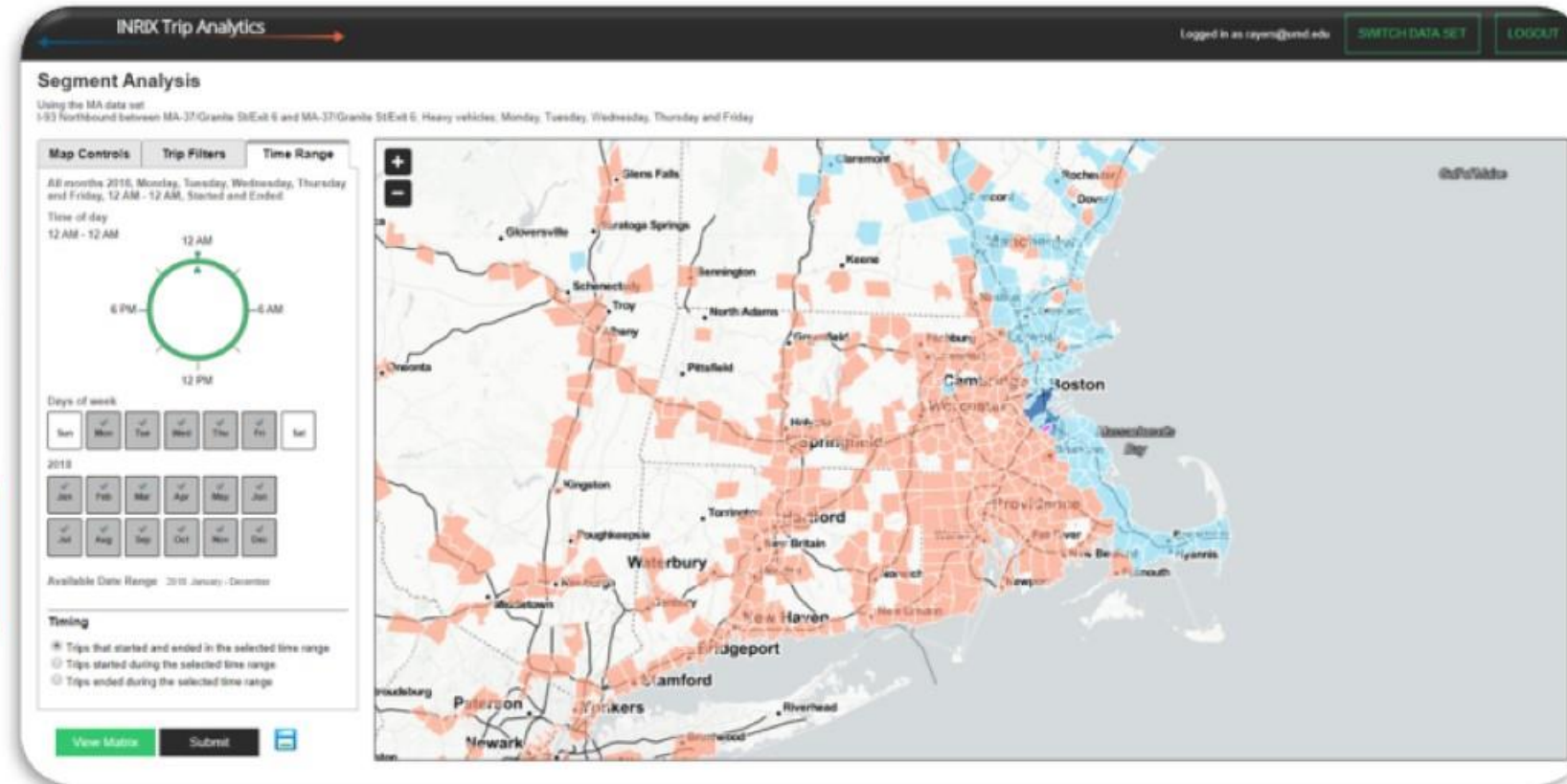
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Analyze the routes between different geographies during different dates and time periods

START



Trip Analytics 3.0

 **SEGMENT ANALYSIS**
Analyze the different origins and destinations of trips that passed through selected road segments

START

Trip Analytics

Logged in as [rayens@umd.edu](#) | [My History](#) | [Help](#) | [Logout](#)

Welcome to Trip Analytics What's New Nov 8, 2021

Pick one of the available data sets to explore.

DATA SETS	DATA PROVIDER	DATE RANGE	DETAILS
407ETR	INRIX	2021: January - November	Learn more about the 407ETR data set . Trip Types Included: <ul style="list-style-type: none">Internal (trips starting and ending in 407ETR)From - To (trips starting in 407ETR and ending outside of 407ETR)To - From (trips starting outside of 407ETR and ending in 407ETR)Pass Through (trips starting and ending outside of 407ETR that have at least one waypoint in 407ETR) View information...
Georgia	INRIX	2019: February, August, October 2020: February, August, October 2021: February, August, October	Learn more about the Georgia data set . Trip Types Included: <ul style="list-style-type: none">Internal (trips starting and ending in GA)From - To (trips starting in GA and ending outside of GA)To - From (trips starting outside of GA and ending in GA)Pass Through (trips starting and ending outside of GA that have at least one waypoint in GA) View information...
Hudson County New Jersey - Freight	INRIX	2020: January - December 2021: January - November	Learn more about the Hudson County New Jersey - Freight data set . Trip Types Included: <ul style="list-style-type: none">Internal (trips starting and ending in HCNJF)From - To (trips starting in HCNJF and ending outside of HCNJF)To - From (trips starting outside of HCNJF and ending in HCNJF)Pass Through (trips starting and ending outside of HCNJF that have at least one waypoint in HCNJF) View information...
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National Household Travel Survey	MTI	2020: January - December	Learn more about the National Household Travel Survey data set .

Trip and Travel Pattern Insights – Trip Analytics 3.0



OD MATRIX

Set up an Origin-Destination matrix by choosing geographies and dates available

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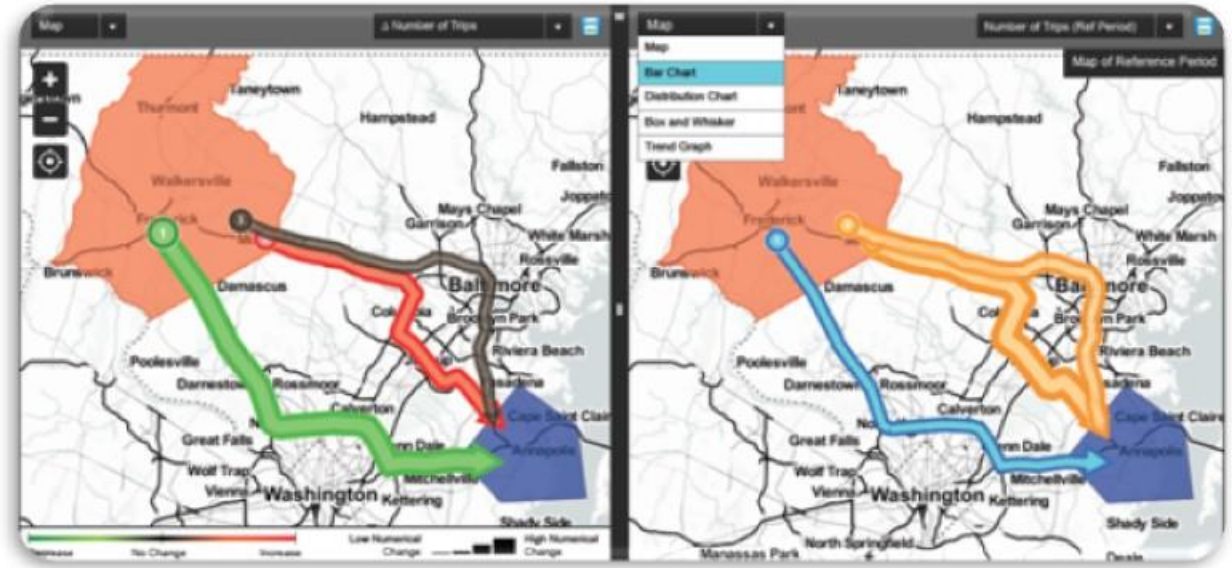
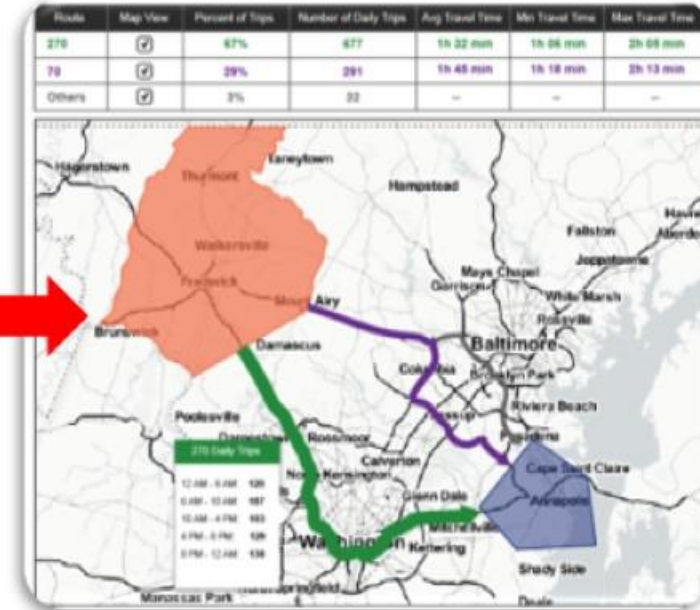
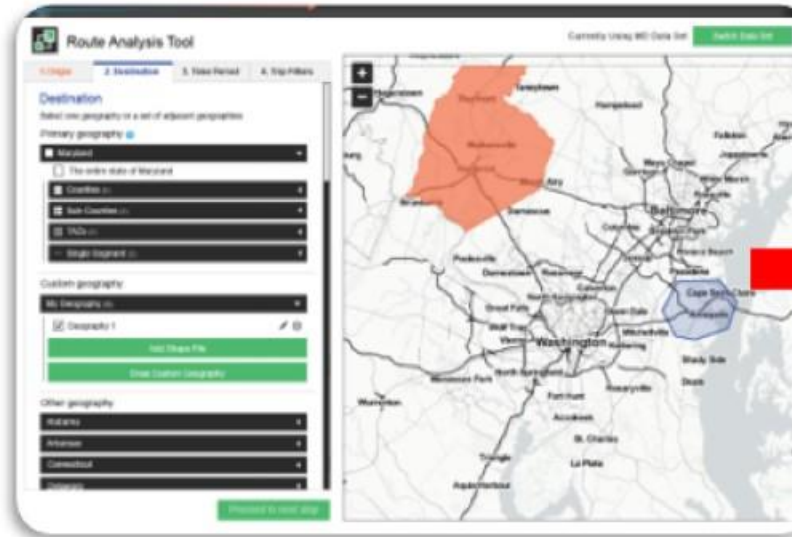
START



ROUTE ANALYSIS

Analyze the routes between different geographies during different dates and time periods

START



Trip Analytics 3.0



ROUTE ANALYSIS

Analyze the routes between different geographies during different dates and time periods

START

Trip Analytics

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My History

Help

LOGOUT

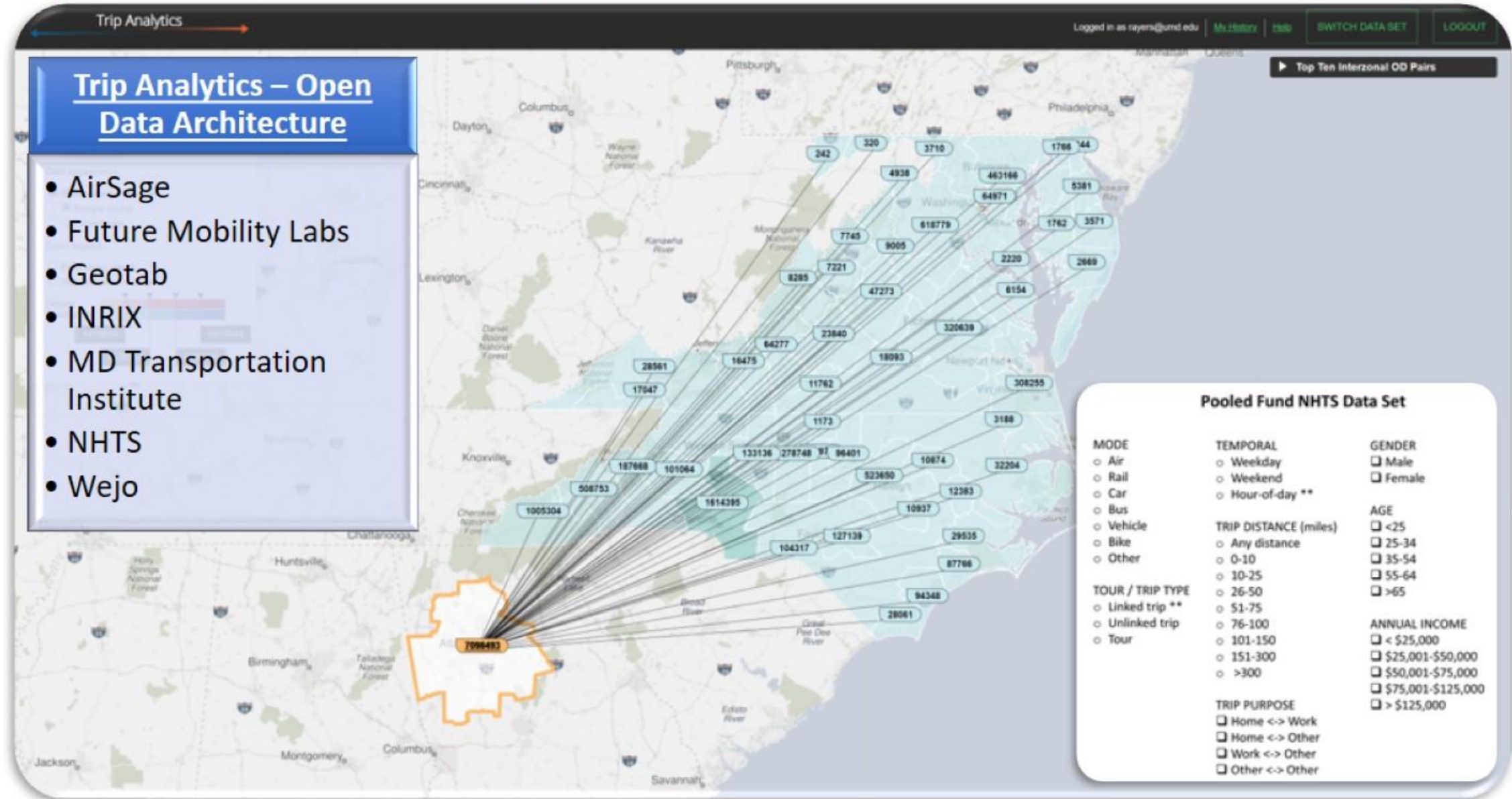
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Nov 8, 2021

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	MTI	2020: January - December	Learn more about the National Household Travel Survey data set

Trip Analytics – Open Data Architecture



Trip Analytics – NHTS 2020

Welcome to Trip Analytics

What's New
Nov 8, 2021

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	MTI	2020: January - December	<p>Learn more about the National Household Travel Survey data set</p>

Trip Analytics – Next Generation

Trip Analytics v4.0

Support for calibrating microsimulation models (e.g. VISSIM, Transmodeler, AIMSUN, etc.)

Designed to analyze small geographic areas

Empowers macro-level analysts

Additional support for trip type filters

Supports bounded study areas

Origins and destinations for external start and endpoints will be reported at crossing points of the study area boundary line

Users can name any area or roadway link as a spatial filter

Multiple trip pass-through options are available that enable advanced strategies for parsing trips

Trip Analytics v3.0

OPEN access to data through export tools

Support for a broad range of OD data sources

Support for waypoint data sources

Zone maps visualizations

Spider diagrams

Segment/Link Analysis

Route analysis reports

Screen lining tools for summarizing specific route trips

Trip Analytics – Release 4.0 (Q2 of 2022)

SPATIAL Filter Use Cases

...commuter arrivals,
7-9 a.m.

Select pass-through settings for this filter:

- Started Inside Ended Inside
 Started Outside Ended Outside



...commuter departures,
4-6 p.m.

- Started Inside Ended Inside
 Started Outside Ended Outside



...only cut-through traffic

- Started Inside Ended Inside
 Started Outside Ended Outside



...only local traffic

- Started Inside Ended Inside
 Started Outside Ended Outside



...all trips in the dataset that
traversed the CBD

- Started Inside Ended Inside
 Started Outside Ended Outside



TRIP TYPE Filters*

Vehicle Types:

- Currently
 - Passenger veh.
 - Med. truck
 - Hvy. truck
- Coming soon
 - Bus
 - Air
 - Rail
 - **Bike**
 - **Pedestrian**

Trip Purpose:

- Home to work / work to home
- Local delivery
- Long haul
- Other to home

Trip Distance:

- < 5 miles
- 5 to 10 miles
- > 10 miles

* Provided 3rd party data that support these attributes

Trip Analytics – Agency Use Cases



Rhode Island DOT, Georgia DOT and Nashville MPO



Origin Destination Matrix



Segment/Link Analysis



Route Analysis



Rhode Island DOT – Truck Trip Analysis

Segment Analysis

Using the RI data set
I-1A Northbound; Medium and Heavy vehicles; All months 2018; All days of week; 12 AM - 12 AM; Started and Ended

Map Controls | **Trip Filters** | **Time Range**

Road Selection
Search for road...

Your selected roads 1 Remove all ⊗

RI-1A Northbound ⊞ ⊗

Directions:
 Northbound Southbound
Interchanges: 3

Entire
 Partial
1.96 miles of roadway selected (2 TMC codes)

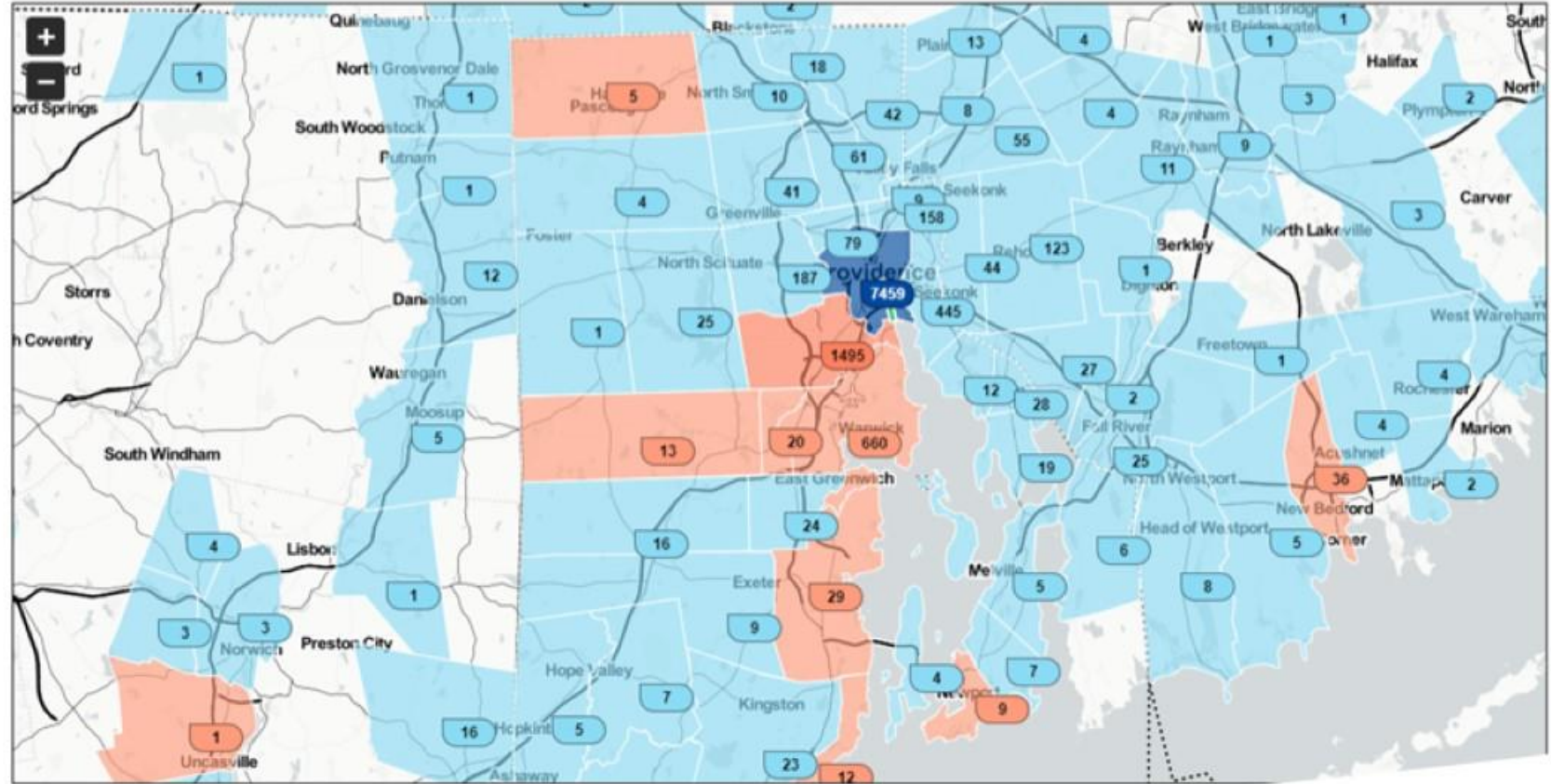
Data is returned only for trips that travelled all selected road segments.

Geographic resolution
Sub-county

For trips through selected road segment, show the...

Origins
 Destinations
 Difference between origins and destinations
 Total of origins and destinations

Data appearance
 Show values on map



We started out with an analysis of Truck Origin and Destinations for Allens Avenue/ Port of Providence

- We quickly realized that we wanted statewide Origin Destinations and a “Heat Mapping Perspective” to determine the locations of the top freight generators and destination patterns within and outside of Rhode Island

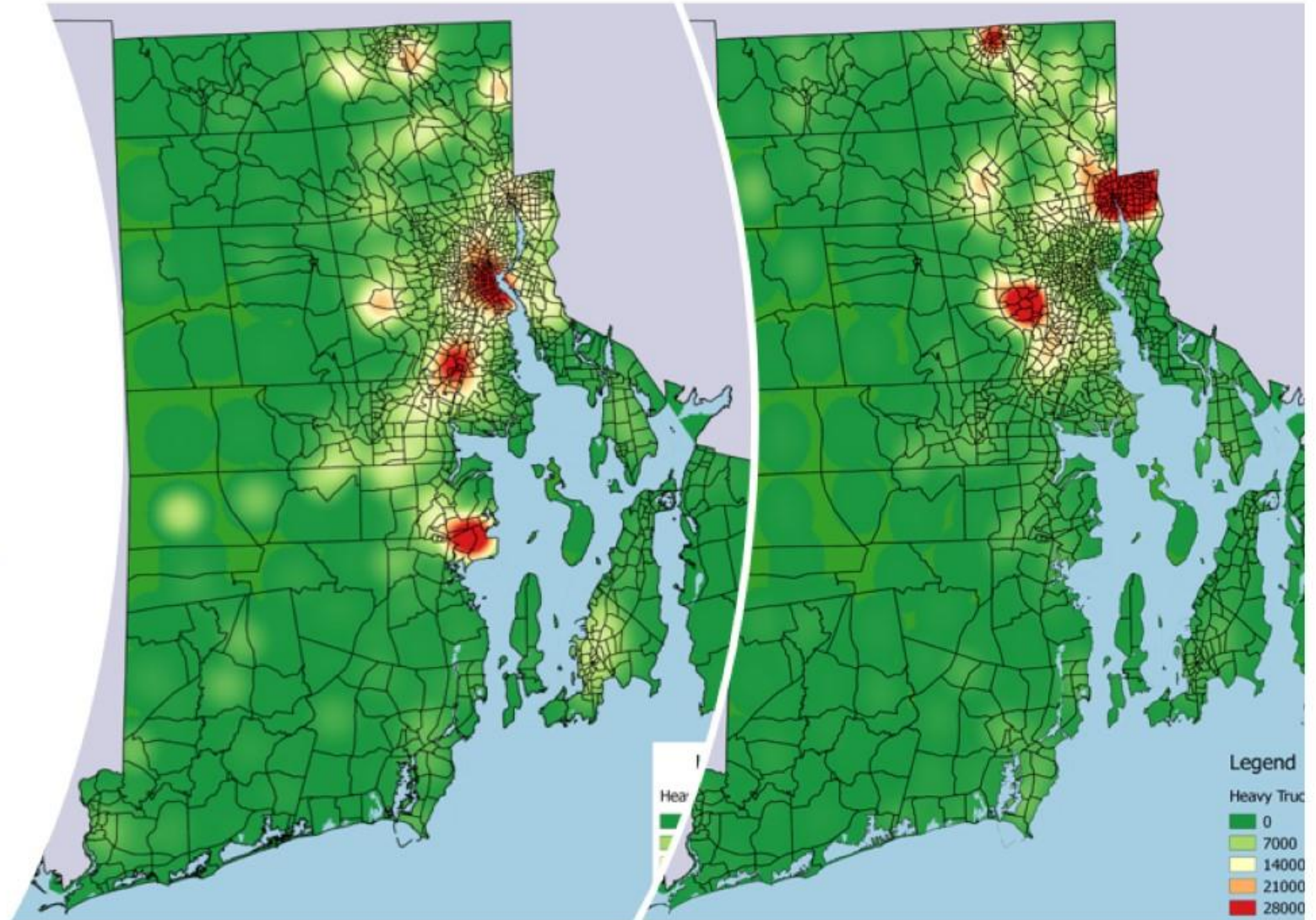
Rhode Island DOT – Truck Trip Analysis

Heavy Truck Origins in Rhode Island

Heavy Truck Destinations in Rhode Island

Heavy Truck Origin and Destination Analysis Statewide Heat Map

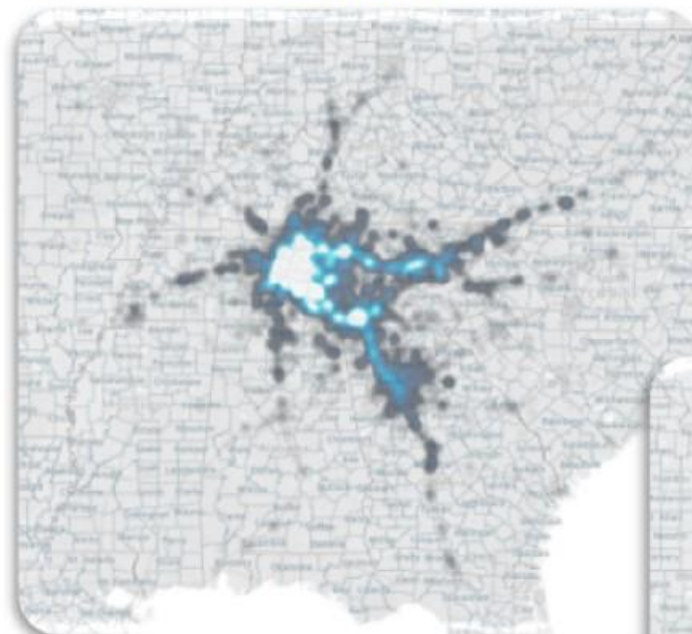
- Evaluating merits of tolling of freight trucks that pass through the state



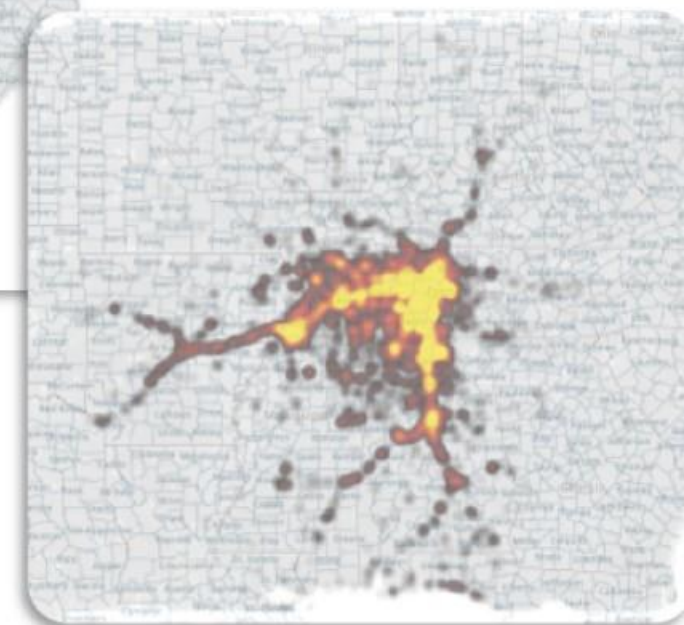
Greater **Nashville** Regional Council – Freight Movement

- Evaluating Benefits of Bypass
 - High freight usage LINK analysis
 - Shipping and receiving supply chain analysis
 - Results analyzed by groups of Os and Ds
 - Integrate data output into Tableau for further evaluation and analysis

ORIGINS



DESTINATIONS



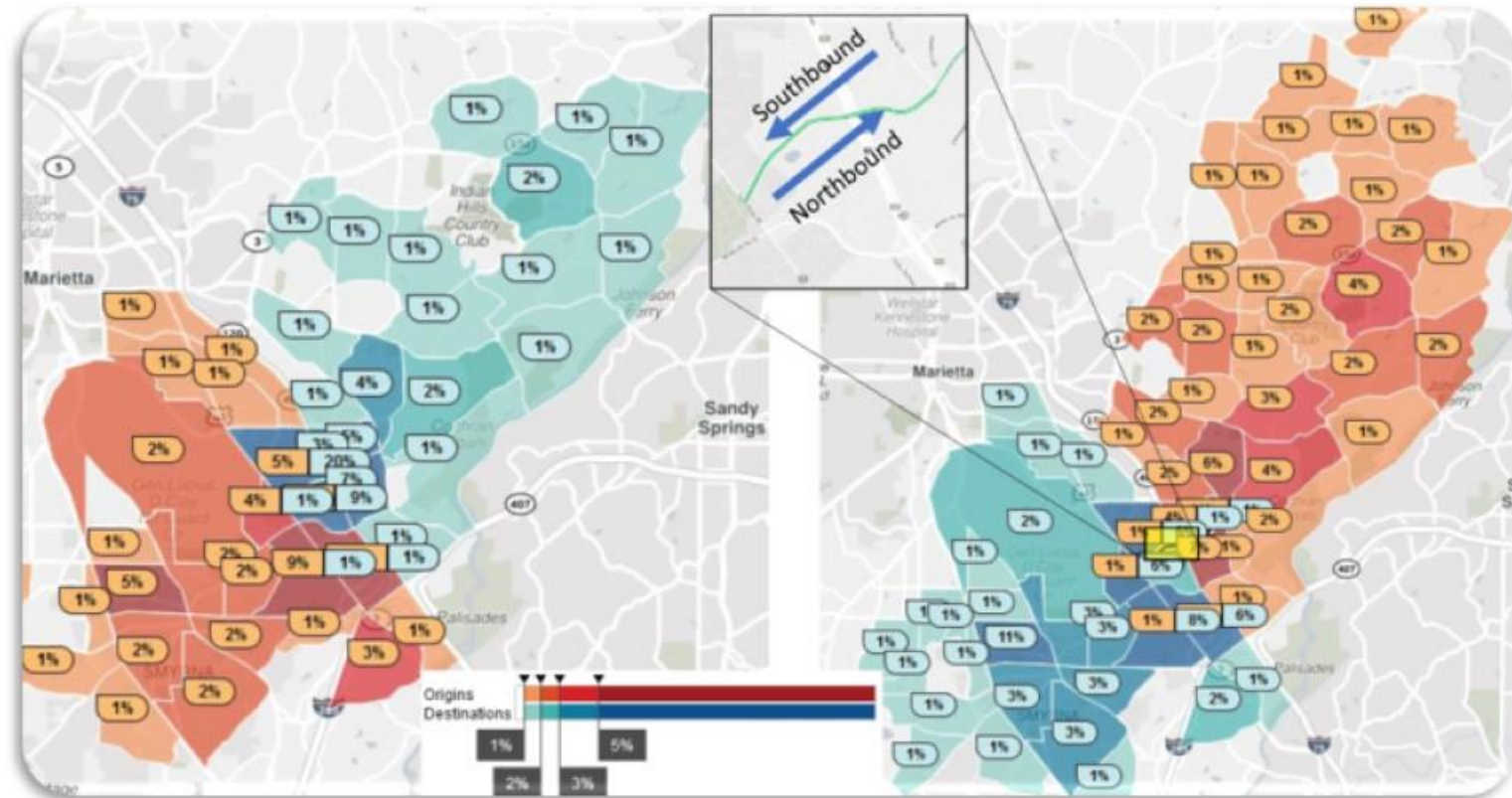
GDOT – Atlanta Region – S-Shaped Flyover Evaluation

Terrell Mill Flyover

- Analytics to estimate proportion of the current trips which will be diverted to the flyover (if built)
- Analysis will support decision making process for flyover
- TA assisting in capacity analysis at the two intersections with more accurate, data-driven trip distribution



SR 3/US 41/Cobb Pkwy at Windy Hill Rd and Terrell Mill Rd



Use Case Scenarios and Review

Trip Analytics



Use Cases for Trip Analytics with OD/Waypoint Data



OPERATIONS

- Planning detours or reacting to emergencies
- Assess traffic impacts from a pandemic or related natural event
- Planning for maintenance-of-traffic (MOT) through planned work zones
- Before and after studies
- Evaluating impacts of signal re-timings
- Evaluating detour routes for events/crashes
- Evaluating evacuations (before, during, and after)
- Evaluating impacts of road closures, crashes, etc.
- Respond to public and/or elected officials in support of inquiries regarding (congestion bottlenecks, trucks cutting through



PLANNING

- Evaluating impacts of tolling
- Travel demand model calibration
- Travel time reliability studies
- Respond to public and/or elected officials in support of inquiries regarding (congestion bottlenecks, trucks cutting through neighborhoods, etc.)
- Select-link analysis
- Identifying freight hotspots
- Needs Assessments (where should I build a bridge, toll road, etc.)
- Tolling assessment
- Validate planning models
- Assessing demand for inter (and intra) city transit and/or park-and-ride lots

Attendee Polling – Q7

Would you consider sharing your use case for Trip Analytics at a future RITIS User Group Web Meeting?

- Yes
- No
- Not sure – Please reach out to me to discuss

Attendee Polling – Q8

We are considering developing additional RITIS Platform training sessions.

Which topics would most interest you if we were to develop them:

- More detailed Trip Analytics scenarios
- Signal performance measures analytics
- Real-time incident detection and management
- Other (share in Q&A box as follows "Q8 – Other RITIS platform related technology demonstration I would be interested in are [])

Attendee Polling – Q9

Please give the CATT Lab a score of 1 to 5 for the value of providing this workshop as resource for your agency

1. Little value
2. Some value
3. Moderately valuable
4. Valuable
5. Extremely valuable

Questions and Answers

The RITIS logo features the word "RITIS" in a blue, serif font. Above the letter "I" are three curved lines in orange and yellow, resembling a signal or Wi-Fi symbol.

RITIS

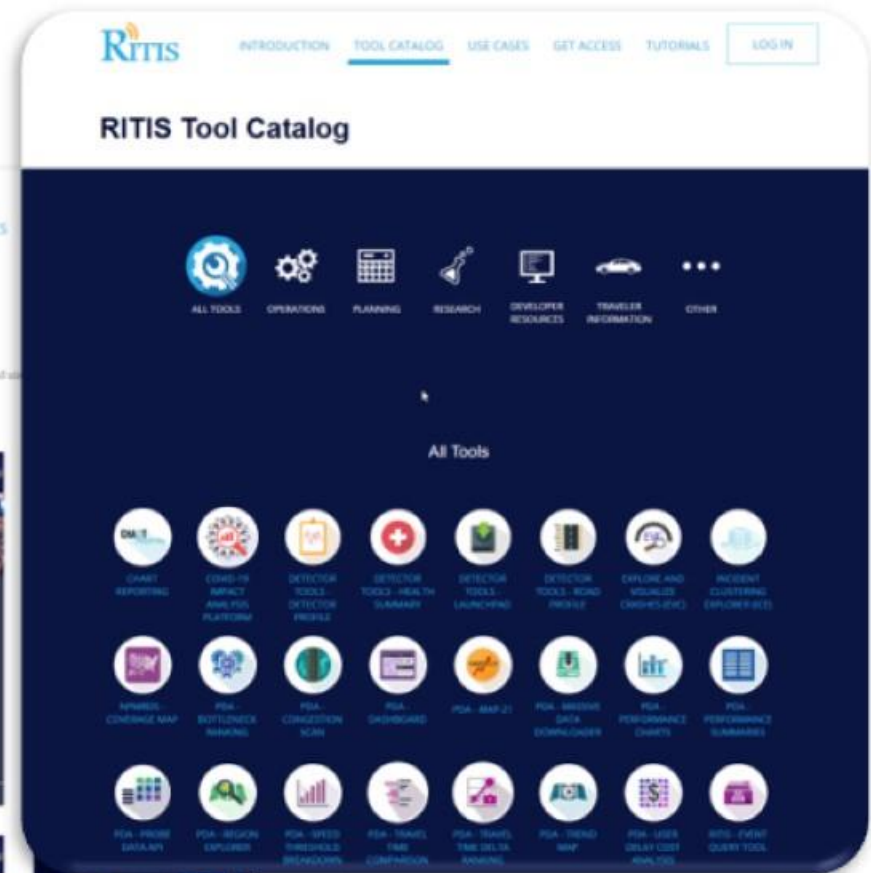
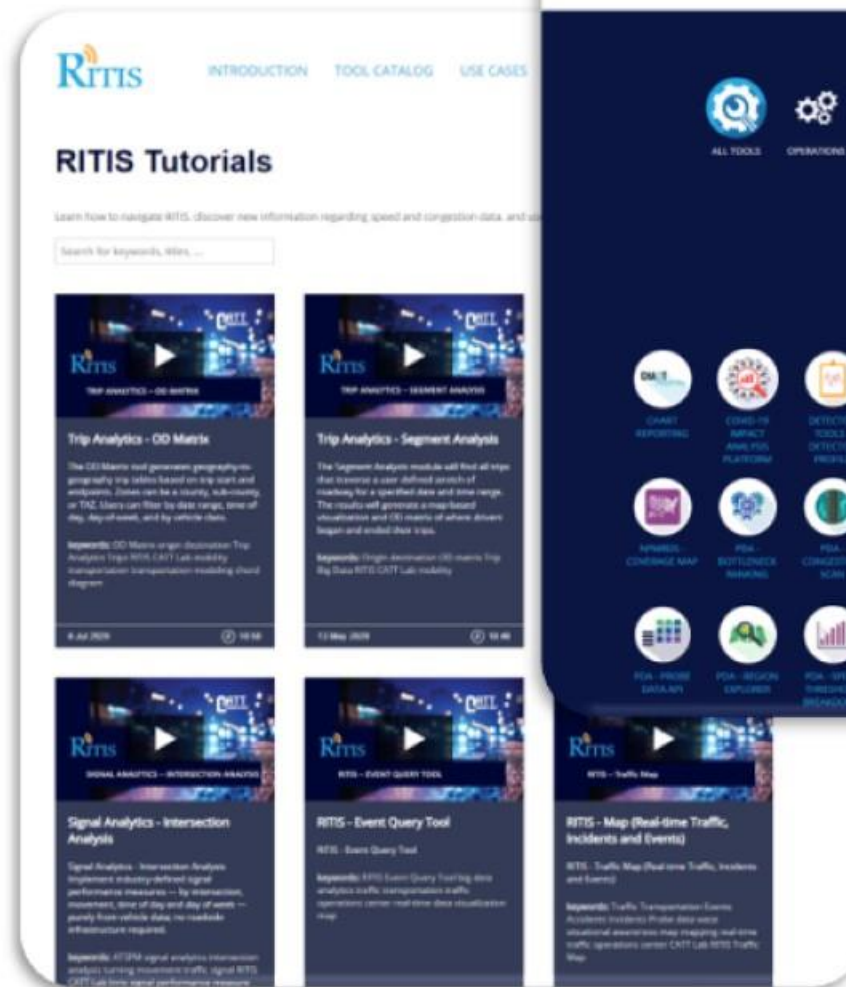
The QATT LABORATORY logo consists of the word "QATT" in a large, white, sans-serif font, with "LABORATORY" in a smaller, white, sans-serif font directly below it. The background is a blurred night street scene with bokeh light effects.

QATT
LABORATORY

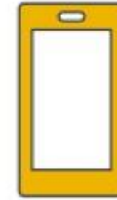
**REGIONAL INTEGRATED
TRANSPORTATION INFORMATION SYSTEM**

RITIS - Trip Analytics - Resources

- RITIS Tool Catalog
 - <https://ritis.org/tools>
- RITIS Tutorials
 - <https://ritis.org/tutorials>



Questions?



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Thank you!

