

High Fidelity Anonymized GPS and LBS Data to Better Understand Trip and Travel Patterns

▶ Data Driven Mobility Insights from RITIS

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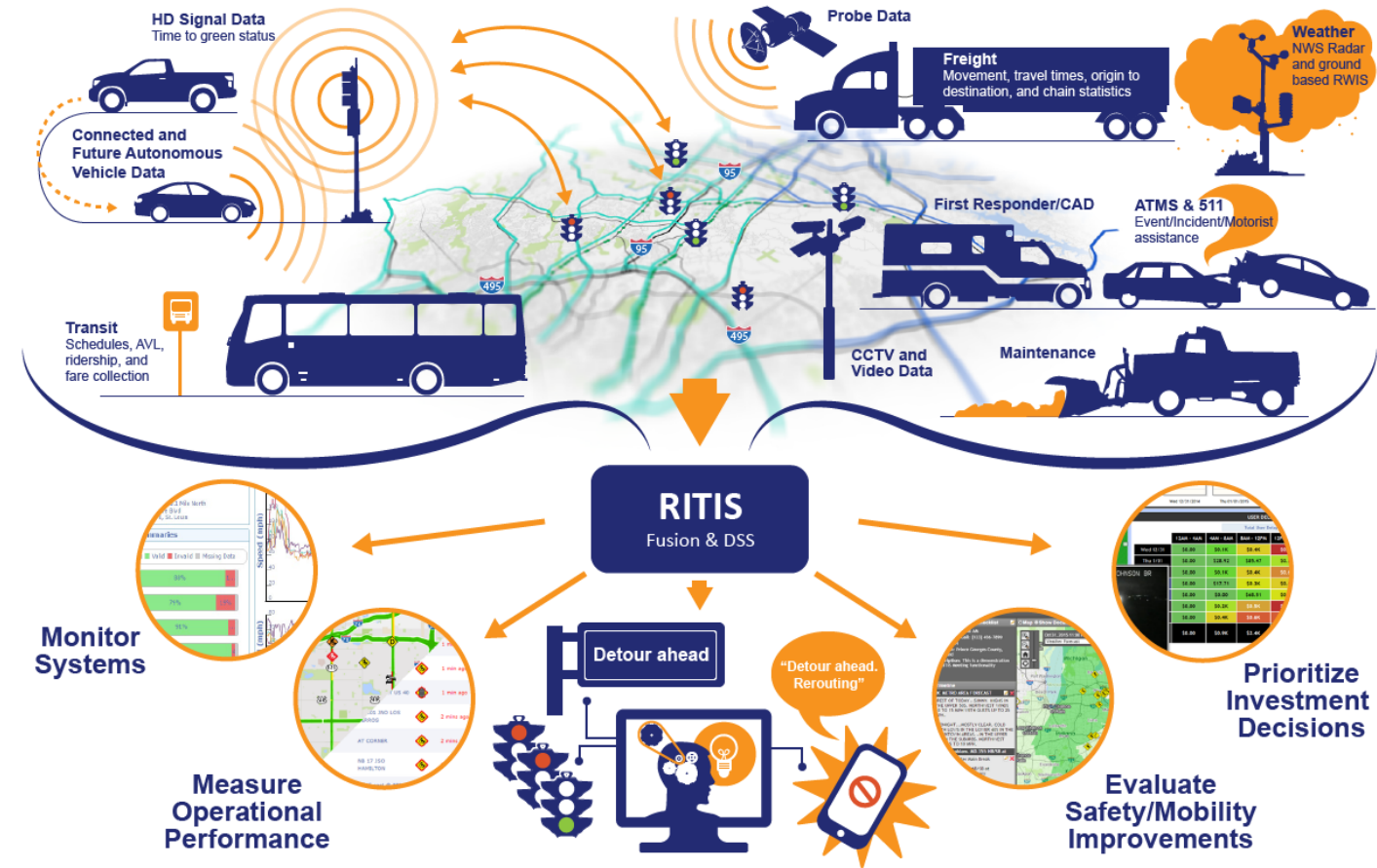
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Agenda

- RITIS Introduction
- Data Sources Overview
- Overview of Trip Analytics
 - Trip and travel pattern insights
- Agency Use Cases
- Q&A

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



<https://ritis.org>

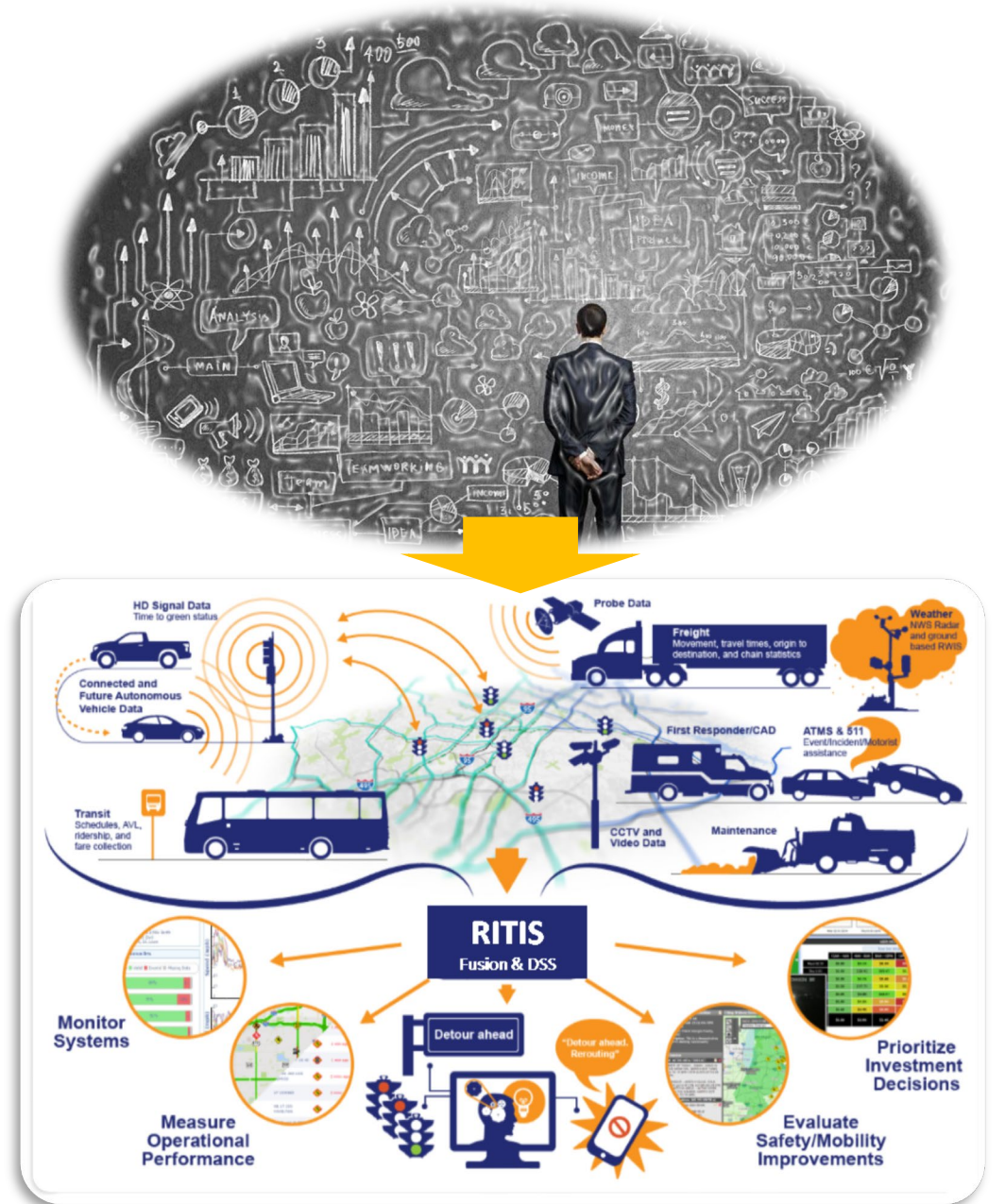
RITIS helps overcome data complexity

►► The CATT Lab supports

transportation agencies with:

- Software solutions & technology innovation,
- Policy guidance,
- Research & development, and
- Thought leadership that helps reduce anxiety and increase big-data capabilities

►► To prevent data saturation:



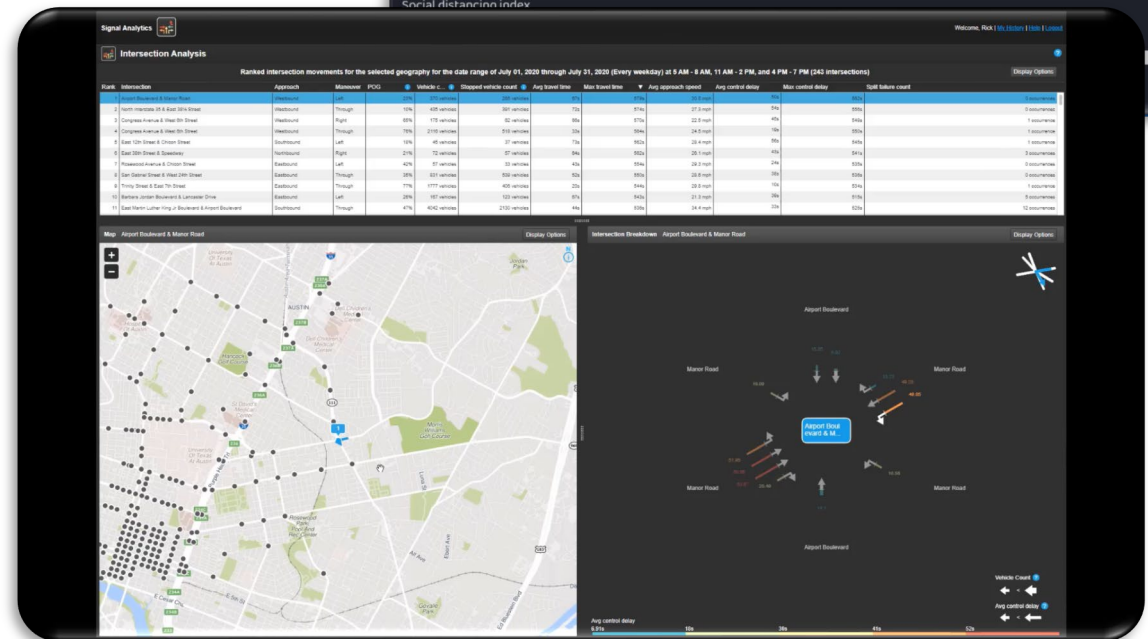
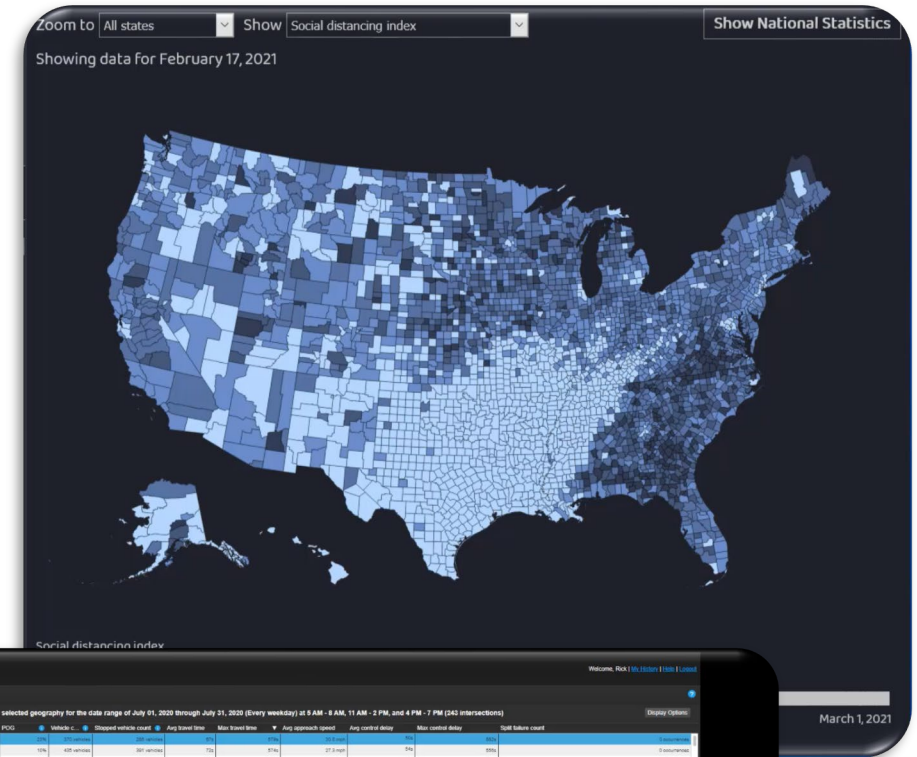
Our Goal with Data is to:

➤ Provide tools to make data

- Easily **accessible** (cloud based),
- **Understandable** (thoughtful UI design),
and
- **Interoperable**

➤ Empowers **DATA DRIVEN** insights

➤ Support agency subject matter experts, executives, legislators and the public



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 with a label. The tools are organized into rows. A yellow box highlights three tools in the 10th row: "TRIP ANALYTICS - OD MATRIX", "TRIP ANALYTICS - SEGMENT ANALYSIS", and "TRIP ANALYTICS - ROUTE ANALYSIS".

RITIS Tool Catalog

INTRODUCTION **TOOL CATALOG** USE CASES GET ACCESS TUTORIALS LOG OUT

RITIS Tool Catalog

ALL TOOLS OPERATIONS PLANNING RESEARCH DEVELOPER RESOURCES TRAVELER INFORMATION OTHER

All Tools

CHART REPORTING COVID-19 IMPACT ANALYSIS PLATFORM DETECTOR TOOLS - DETECTOR PROFILE DETECTOR TOOLS - HEALTH SUMMARY DETECTOR TOOLS - LAUNCHPAD DETECTOR TOOLS - ROAD PROFILE EXPLORE AND VISUALIZE CRASHES (EVC) INCIDENT CLUSTERING EXPLORER (ICC)

NPMBDS - COVERAGE MAP PDA - BOTTLENECK RANKING PDA - CONGESTION SCAN PDA - DASHBOARD PDA - MAP-21 PDA - MASSIVE DATA DOWNLOADER PDA - PERFORMANCE CHARTS PDA - PERFORMANCE SUMMARIES

PDA - PROBE DATA API PDA - REGION EXPLORER PDA - SPEED THRESHOLD BREAKDOWN PDA - TRAVEL TIME COMPARISON PDA - TRAVEL TIME DELTA RANKING PDA - TREND MAP PDA - USER DELAY COST ANALYSIS RITIS - EVENT QUERY TOOL

RITIS - INCIDENT ALERTS RITIS - INCIDENT LIST RITIS - INCIDENT OVERVIEW RITIS - INCIDENT TIMELINE RITIS - MAP RITIS - MEETING RITIS - RITIS FILTER API RITIS - SPEED ALERTS

RITIS - TRAFFIC CAMERAS RITIS - TRAFFIC VIEW RITIS - WORK ZONE PERFORMANCE SERIAL ANALYTICS - INTERSECTION ANALYSIS **TRIP ANALYTICS - OD MATRIX** **TRIP ANALYTICS - SEGMENT ANALYSIS** **TRIP ANALYTICS - ROUTE ANALYSIS** TREEVERSITY

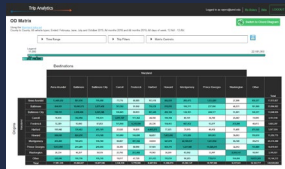
VIRTUAL INCIDENT MANAGEMENT TRAINING VIRTUAL WEIGH STATION 4D VIRTUAL GLOBE

CATT
LABORATORY

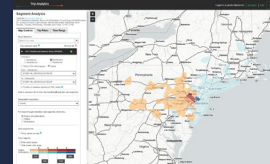
Trip and Travel Pattern Insights



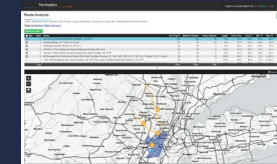
Origin Destination Matrix



Segment/Link Analysis



Route Analysis



Foundational Source Data –

100 million+ trips per day in the US - Multiple Types - All GPS Based

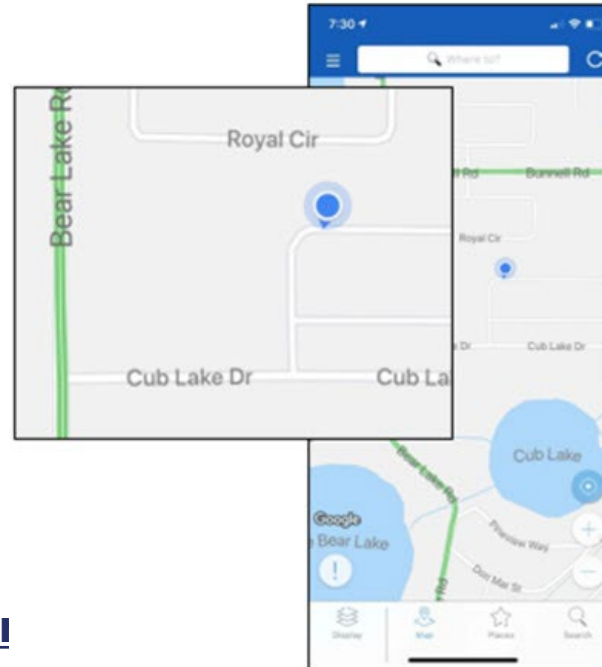
» Data Types:

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

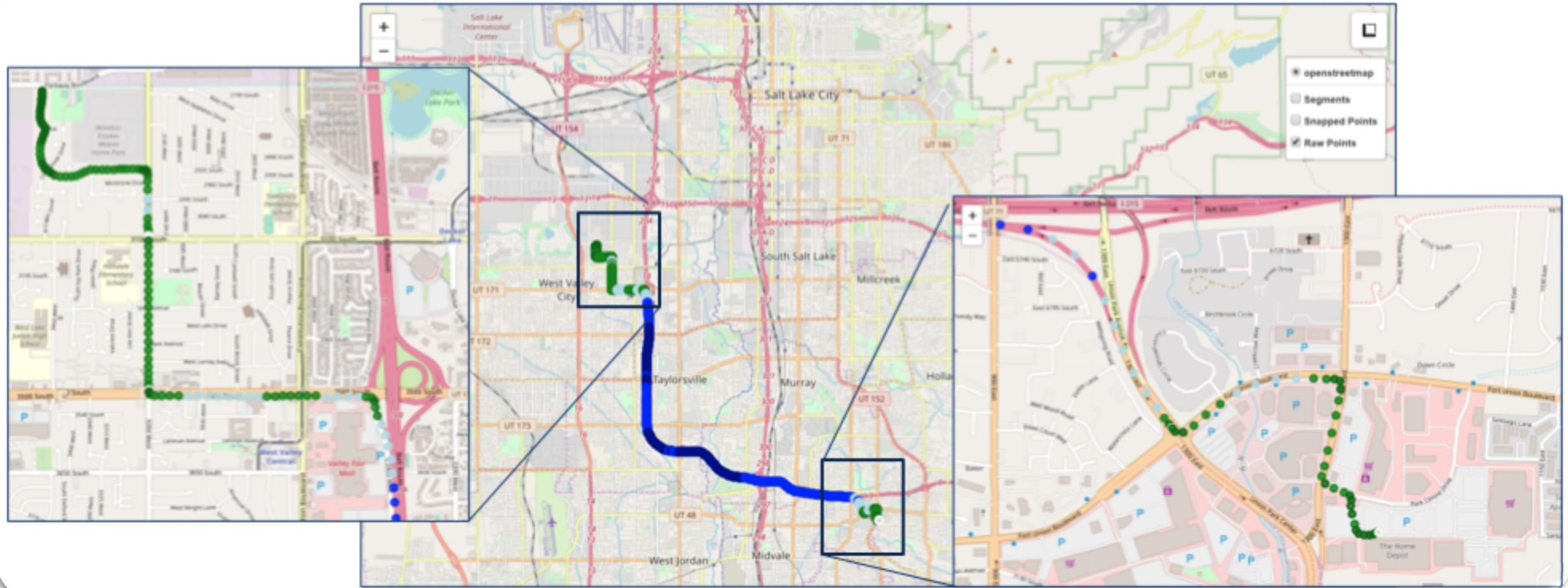
» Core Source Data Elements:

- Device/Trip ID
- Location
- Heading
- Speed

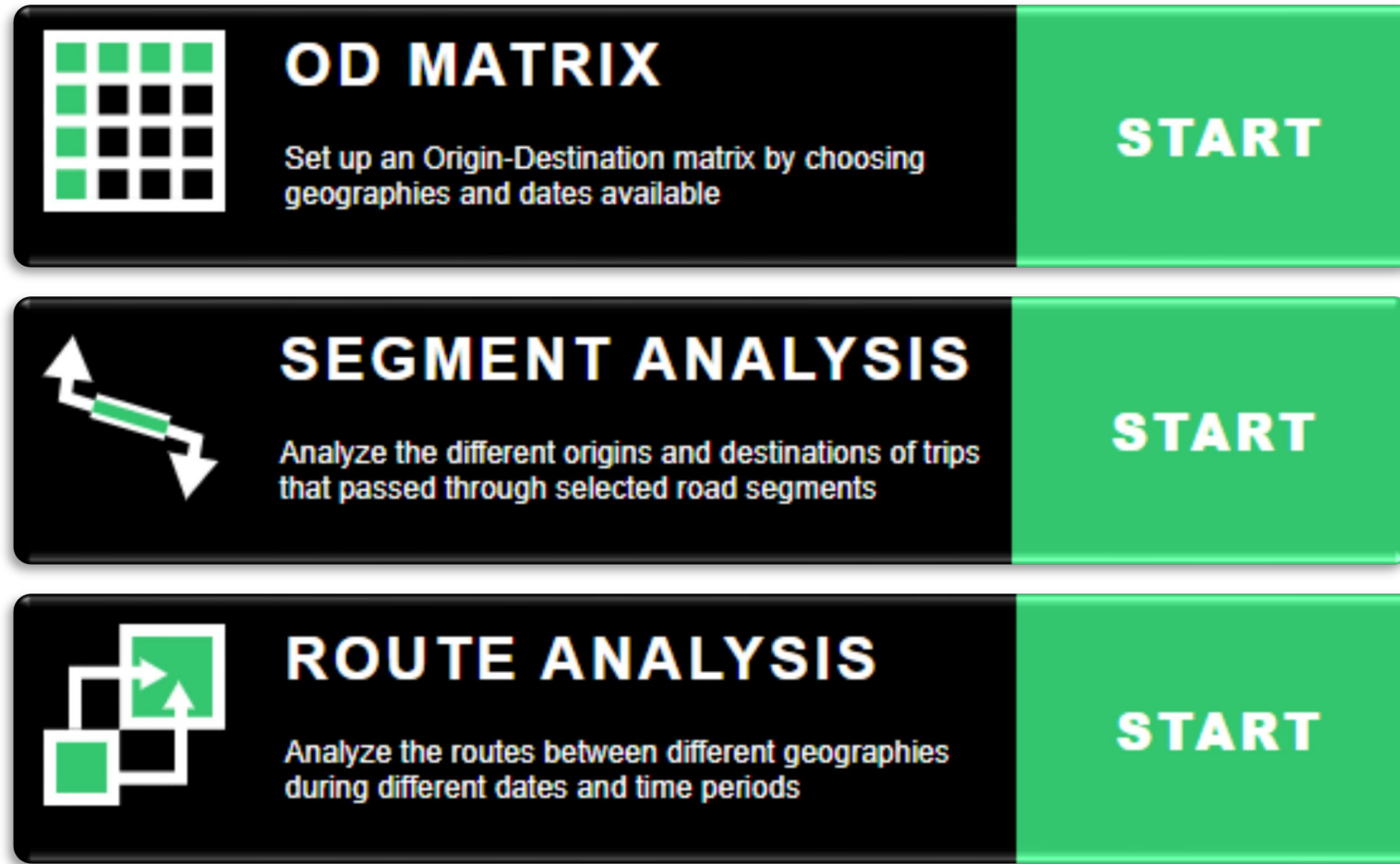
» All Output Data Can be Downloaded for Further Analysis



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



Trip and Travel Pattern Insights – Trip Analytics



Trip and Travel Pattern Insights – Trip Analytics



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

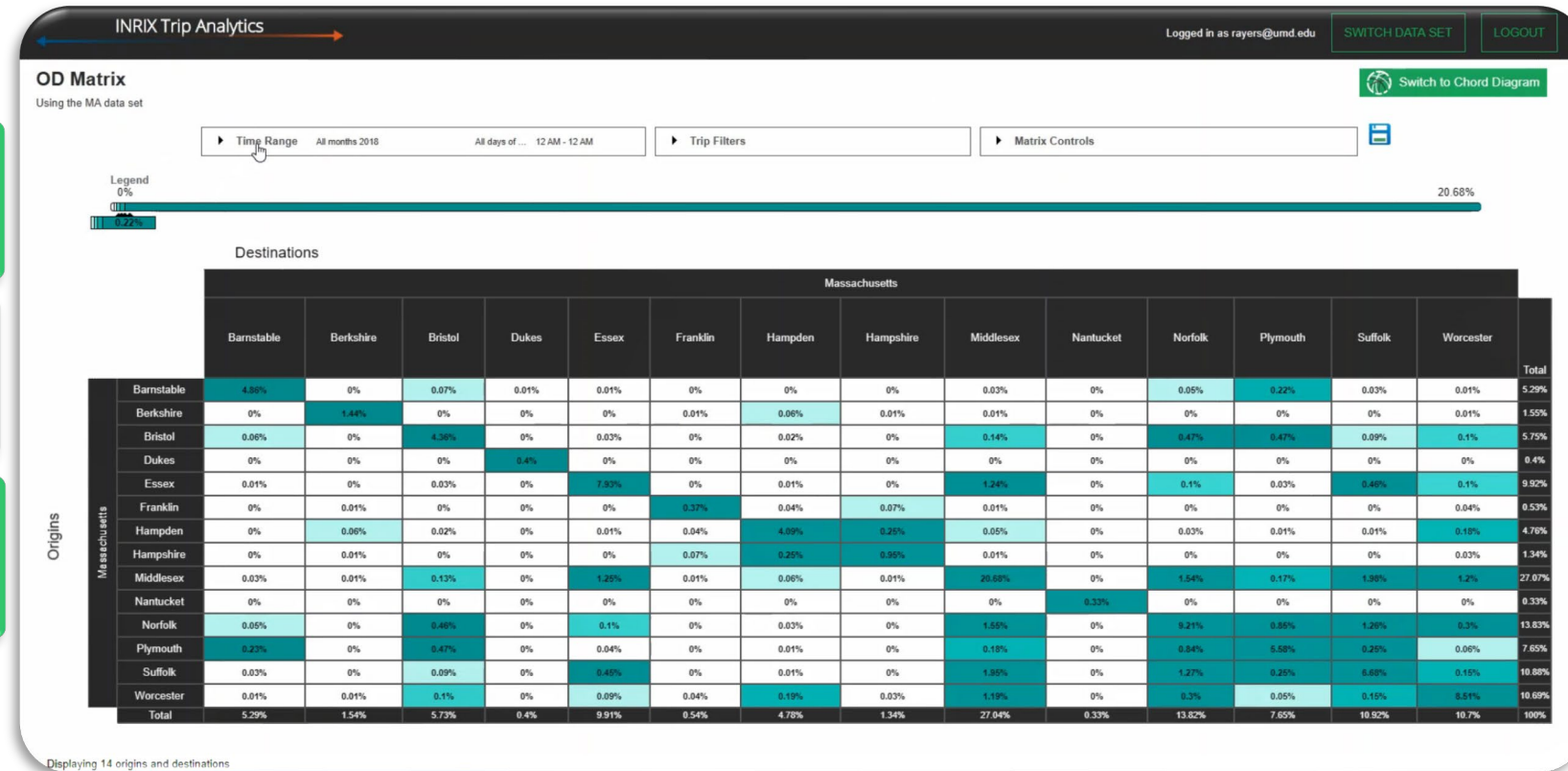
START



ROUTE ANALYSIS

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

START



Trip Analytics



OD MATRIX

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

START

← INRIX Trip Analytics →

Username:

Password:

[Forgot Password](#)

Access to Trip Analytics is linked to your [RITIS](#) account. If you do not have a RITIS account, you can request one [here](#).

Only members of agencies that have signed the Trip Analytics Data Use Agreement will be granted access to Trip Analytics.

Trip and Travel Pattern Insights – Trip Analytics



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

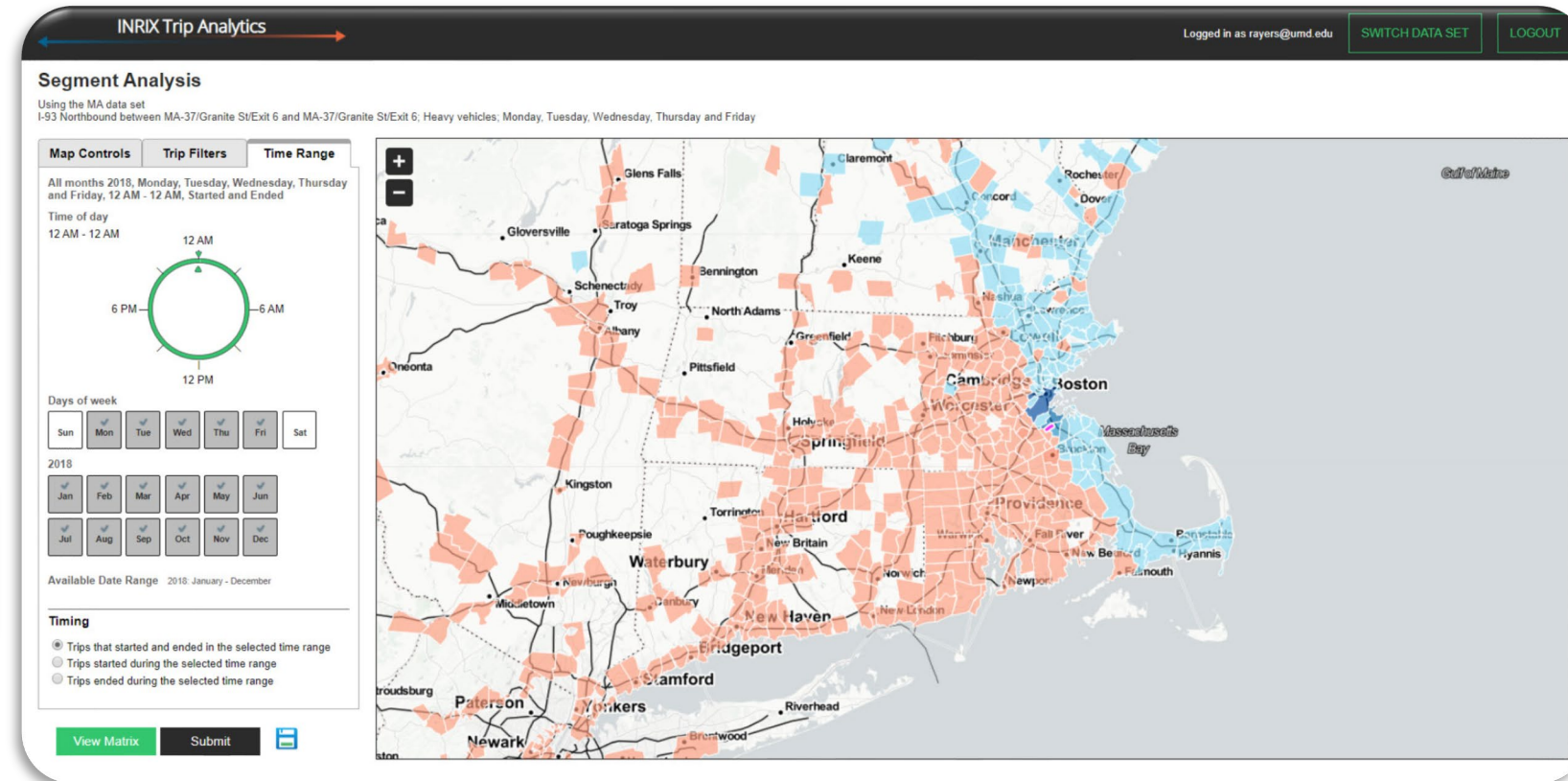
START



ROUTE ANALYSIS

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

START



Trip Analytics

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

START

INRIX Trip Analytics

Logged in as rayers@umd.edu

SWITCH DATA SET

LOGOUT

Welcome to INRIX Trip Analytics

Please choose one of the available data sets to explore:

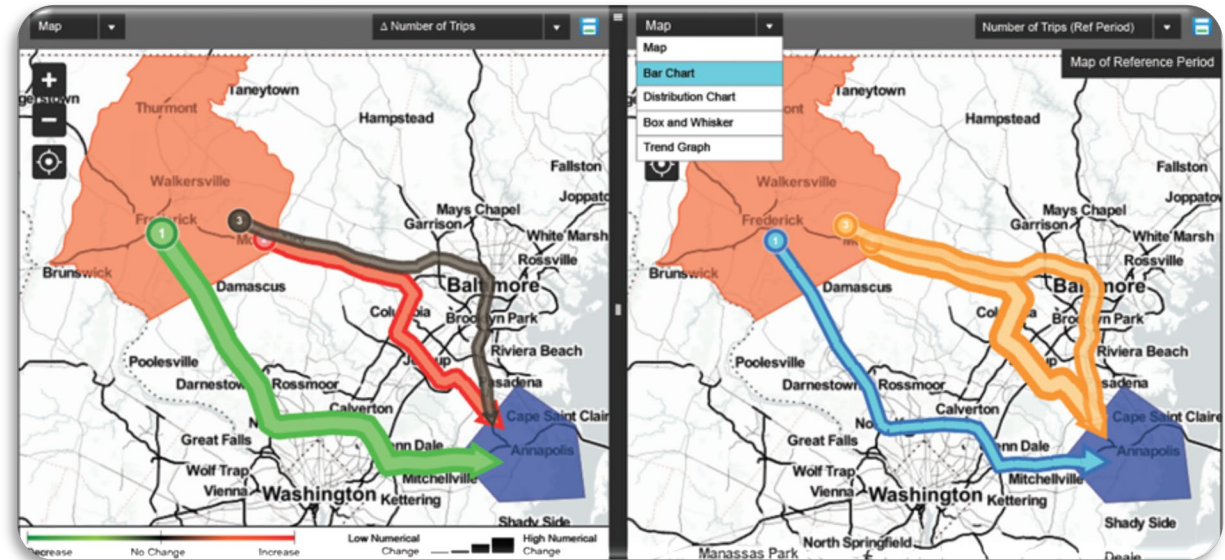
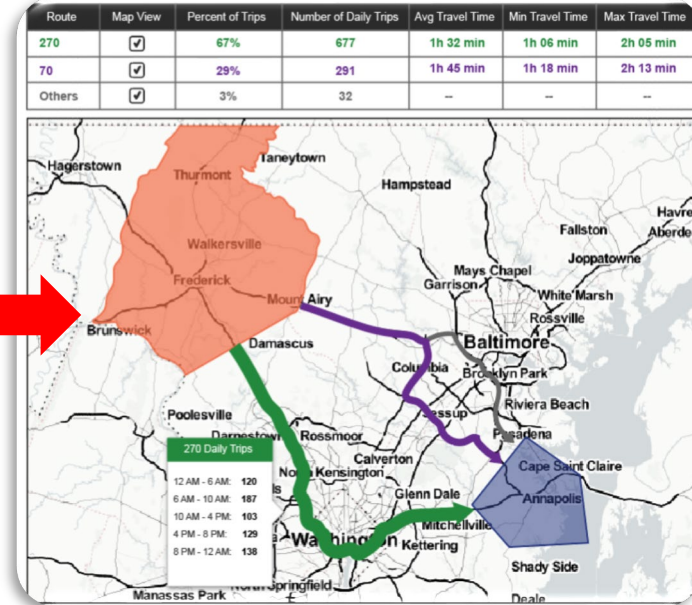
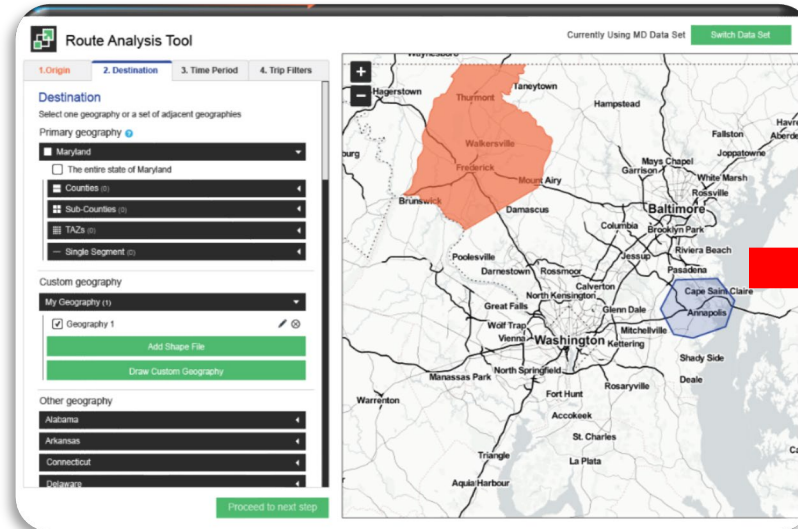
DATA SETS	DATA PROVIDER	DATE RANGE	DETAILS
Maryland	INRIX	2015: February, June, July, October 2018: January - December 2019: January - September	Spatial Data Granularity: Latitude/Longitude Vehicle Types Included: Cars and Trucks (separated or aggregated) Waypoints Included: Yes More information...
Massachusetts	INRIX	2018: January - December	Spatial Data Granularity: Latitude/Longitude Vehicle Types Included: Cars and Trucks (separated or aggregated) Waypoints Included: Yes More information...
Rhode Island	INRIX	2018: January - December	Spatial Data Granularity: Latitude/Longitude Vehicle Types Included: Cars and Trucks (separated or aggregated) Waypoints Included: Yes More information...
Washington DC	INRIX	2015: January - December	Spatial Data Granularity: Latitude/Longitude Vehicle Types Included: Cars and Trucks (separated or aggregated) Waypoints Included: Yes More information...

Trip and Travel Pattern Insights – Trip Analytics

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 Analytics



ROUTE ANALYSIS

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

START

trips.ritis.org

Trip Analytics

Logged in as gjordan1@umd.edu | [My History](#) | [Help](#) | [SWITCH DATA SET](#) | [LOGOUT](#)

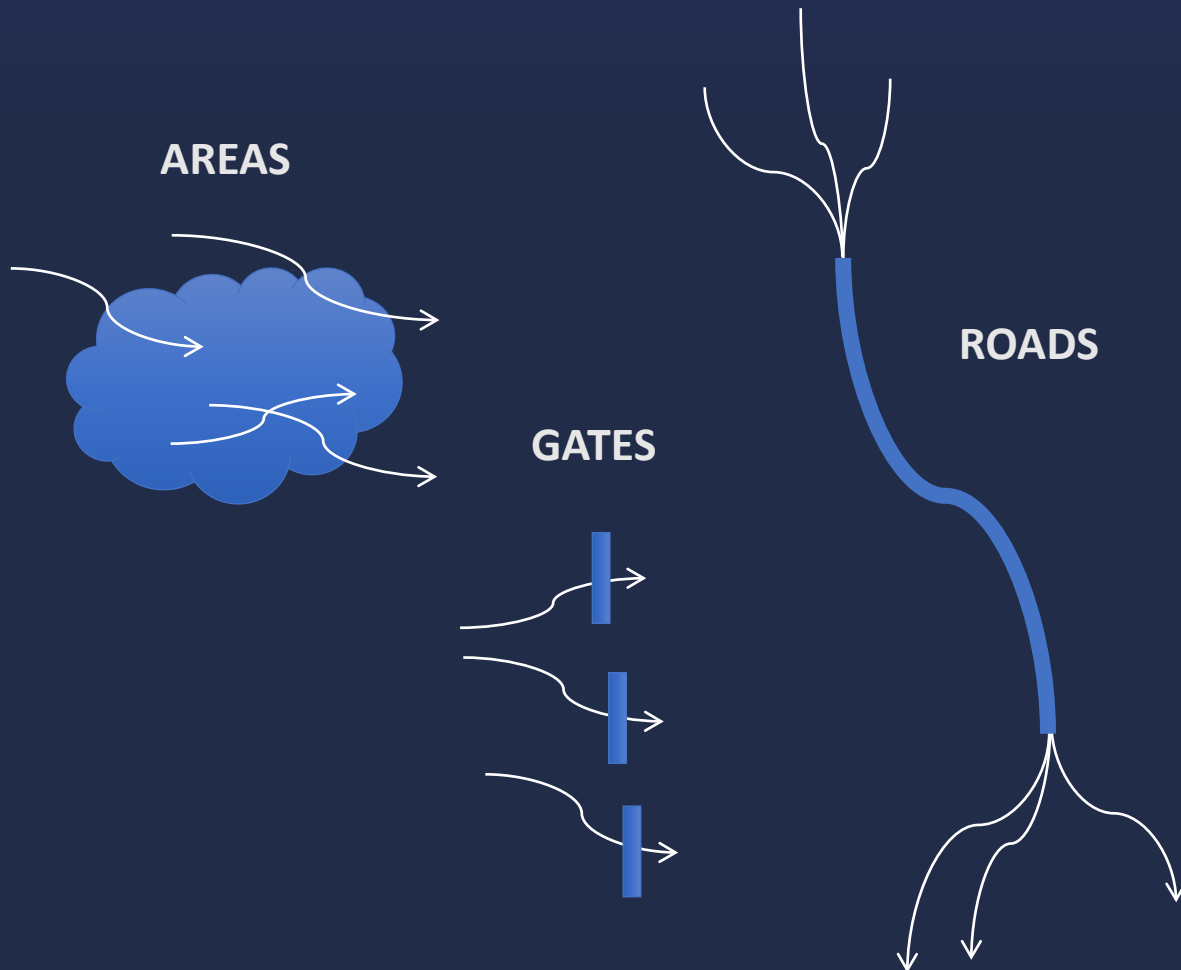
Welcome to Trip Analytics What's New Sep 14, 2020

Pick one of the available data sets to explore.

DATA SETS	DATA PROVIDER	DATE RANGE	DETAILS
Maryland	INRIX	2015: February, June, July, October 2018: January - December 2019: January - December	Trip Types Included: <ul style="list-style-type: none">Internal (trips starting and ending in MD)From - To (trips starting in MD and ending outside of MD)To - From (trips starting outside of MD and ending in MD)Pass Through (trips starting and ending outside of MD that have at least one waypoint in MD) More information...
Massachusetts	INRIX	2015: March - May 2018: January - December 2019: January - December	Custom TAZ map: Custom TAZ map Trip Types Included: <ul style="list-style-type: none">Internal (trips starting and ending in MA)From - To (trips starting in MA and ending outside of MA)To - From (trips starting outside of MA and ending in MA)Pass Through (trips starting and ending outside of MA that have at least one waypoint in MA) More information...
New York City	INRIX	2019: January - December 2020: January - August	Trip Types Included: <ul style="list-style-type: none">Internal (trips starting and ending in NYC)From - To (trips starting in NYC and ending outside of NYC)To - From (trips starting outside of NYC and ending in NYC)Pass Through (trips starting and ending outside of NYC that have at least one waypoint in NYC) More information...
Pennsylvania	INRIX	2020: January 1 - 10	Trip Types Included: <ul style="list-style-type: none">Internal (trips starting and ending in PA)From - To (trips starting in PA and ending outside of PA)

Trip Analytics – Future Enhancements

New SPATIAL Filters



New TRIP TYPE Filters

- Vehicle Types:
 - Currently (passenger car, medium wt truck, heavy truck)
 - 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

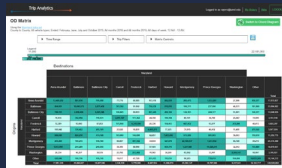
Trip Analytics – Use Cases



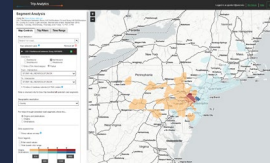
Rhode Island DOT and City of Austin



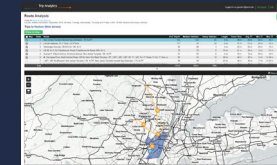
Origin Destination Matrix



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 **x**

RI-1A Northbound **1** **x**

Directions:
 Northbound Southbound
Interchanges: 3
 Entire
 Partial
1.96 miles of roadway selected (2 TMC codes)

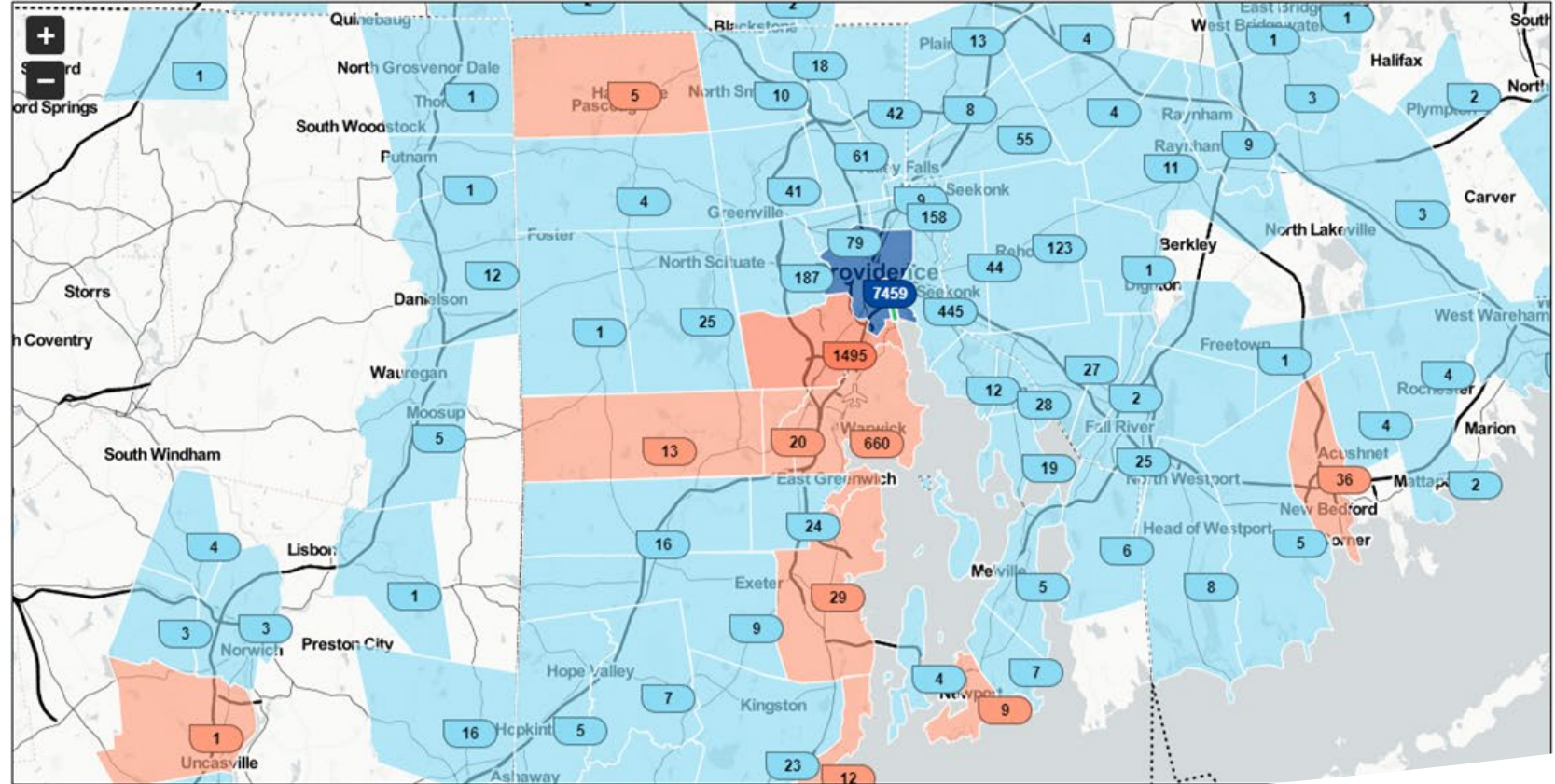
Data is returned only for trips that travelled all selected road segments.

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 **1**



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

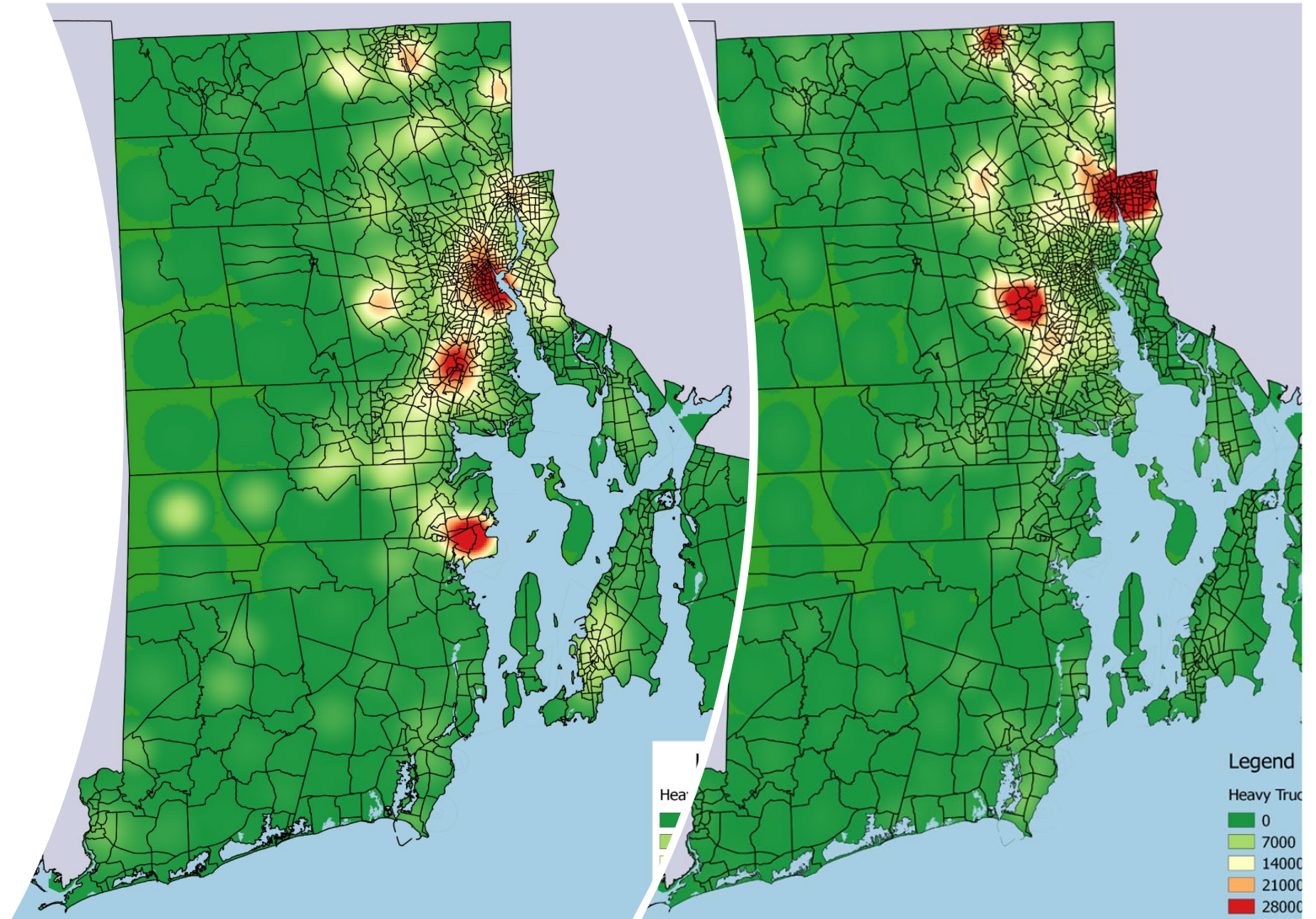
- We quickly realized that we wanted statewide Origin Destinations and a “Heat Mapping Perspective” to determine the locations of the top freight generators and destination patterns within and outside of Rhode Island

Rhode Island DOT – Truck Trip Analysis

Heavy Truck Origin and Destination Analysis Statewide Heat Map

Heavy Truck Origins in Rhode Island

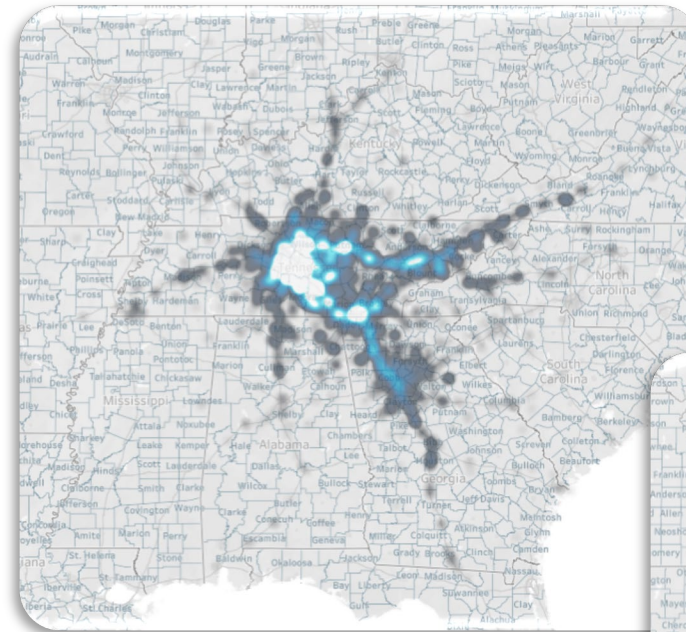
Heavy Truck Destinations in Rhode Island



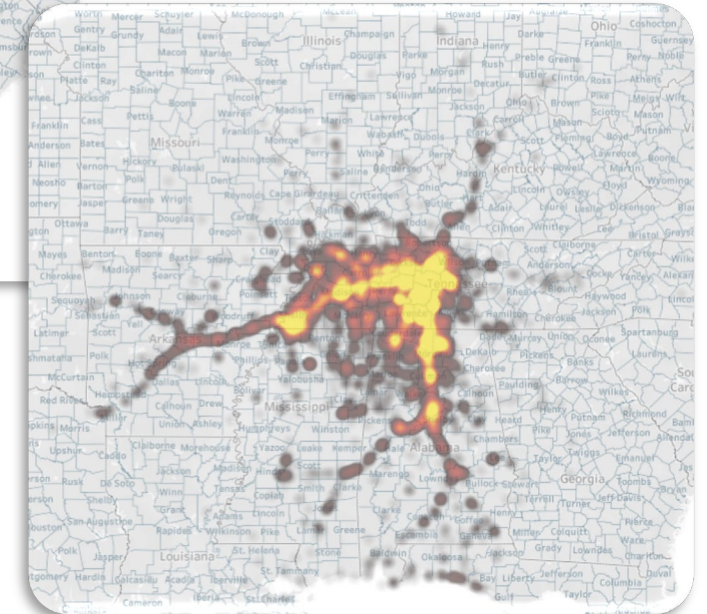
Greater Nashville Regional Council – Freight Movement

- 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



Questions and Answers

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

RITIS

The CATT LABORATORY logo consists of the word "CATT" in a large, white, sans-serif font, with "LABORATORY" in a smaller, white, sans-serif font directly below it. The letters are set against a dark blue background.

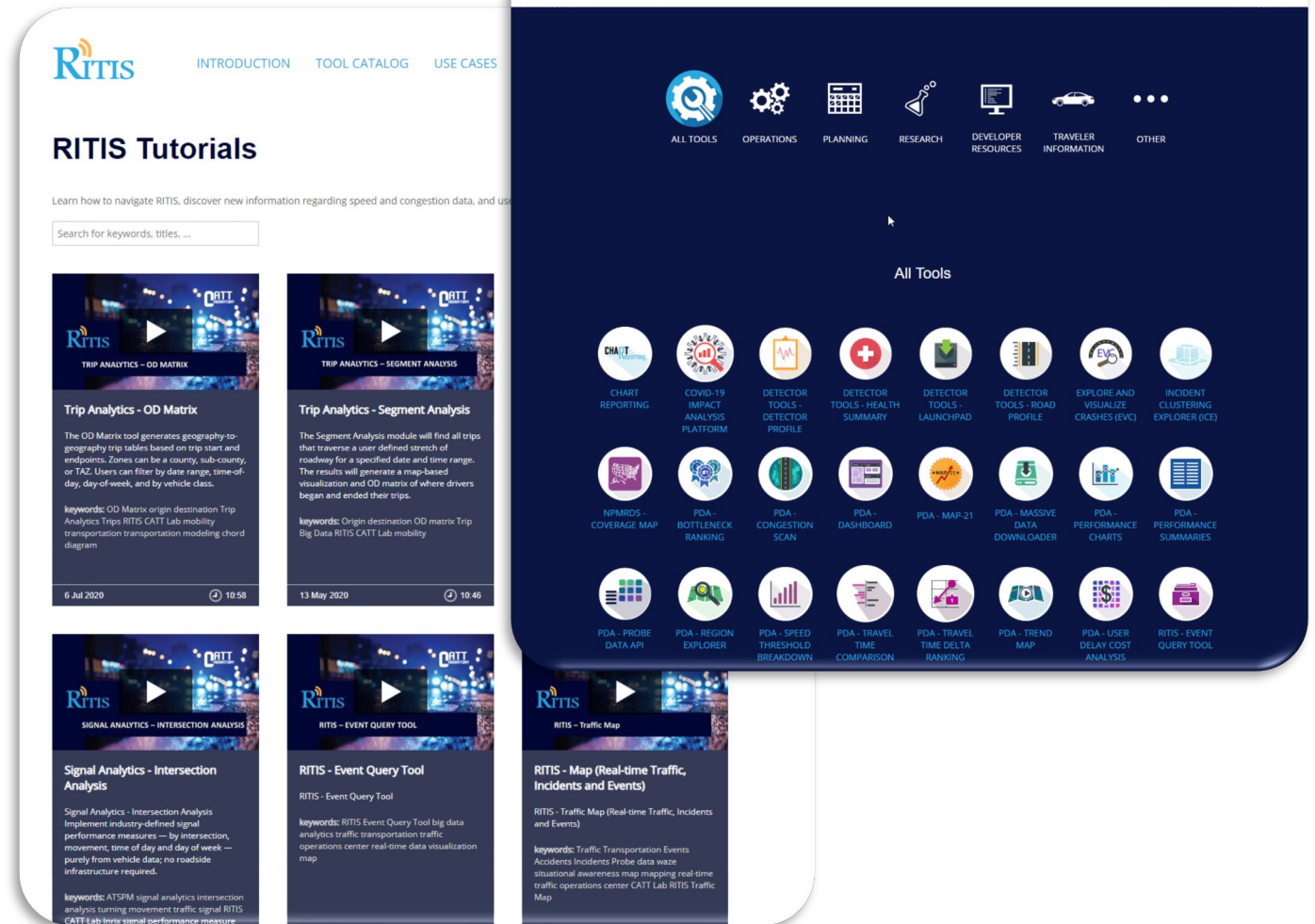
**CATT
LABORATORY**

The background of the slide is a photograph of a wet street at night. The wet pavement reflects the lights from cars and street lamps, creating a bokeh effect of out-of-focus light circles in various colors like blue, yellow, and white. The overall scene is dark and atmospheric.

**REGIONAL INTEGRATED
TRANSPORTATION INFORMATION SYSTEM**

RITIS - Trip Analytics - Resources

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



Thanks!



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