PRIVATE-SECTOR ORIGIN-DESTINATION DATA TSMO APPLICATIONS WEBINAR

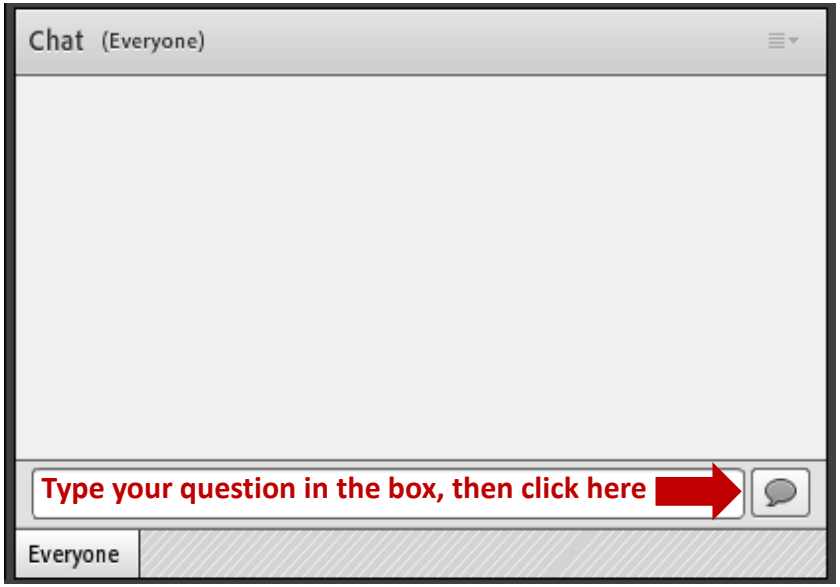
December 6, 2018

Webinar & Audio Information

- The call-in phone number is: **xxx-xxx-xxxx & enter xxxxxxx# at the prompt**
- **Participants will be in "Listen Only" mode throughout the webinar**
- Please press *0 to speak to an operator for questions regarding audio
- Please call Wayne at xxx-xxx-xxxx for difficulties with the web or audio application
- This webinar will be recorded.
- Presentations will be posted to the I-95 Corridor Coalition website. Participants will receive a link to the presentations after they are posted.

Asking Questions

- Please pose your questions using the **chat box**
- Questions will be monitored then answered by the speakers either at the end of their presentation or at the end of the webinar



Welcome and Introductions

Denise Markow, PE

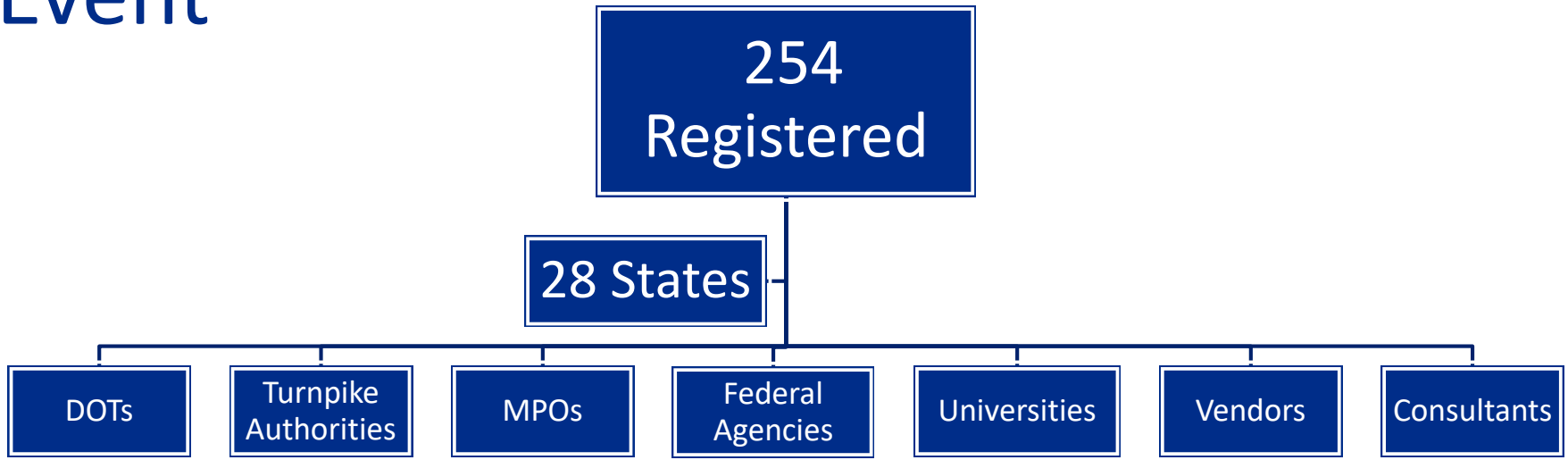
I-95 Corridor Coalition

TSMO Director

Welcome

10:30 am to 10:35 am	Welcome and Introductions	Denise Markow I-95 Corridor Coalition
10:35 am to 10:50 am	HERE Traffic Analytics Trip Data	Joe Guthridge HERE
10:50 am to 11:05 am	Overview of INRIX Trajectory Data Offerings and Capabilities	Rick Schuman INRIX
11:05 am to 11:20 am	Developing National, Multi-modal Origin-Destination Products	Dr. Sepehr Ghader UMD Maryland Transportation Institute
11:20 am to 11:35 am	Web-based Analytics for Trajectory and OD Data	Dr. Mark Franz CATT Lab
11:35 am to 11:50	Signal Timing Analysis using Trajectory Data Analytics	Michael Pack CATT Lab
11:50 pm to 12:00 pm	Wrap Up	Denise Markow I-95 Corridor Coalition

I-95 Corridor Coalition Sponsored Event



16 states + D.C.

In the Corridor

2nd
Largest Economy in the World
$4.7 Trillion
40% of US GDP

37%
Of America's population:
110 Million people

46
Major Seaports
$172 Billion Imports
34% of U.S. total

Background

- 2008 = Probe-based Speed data is introduced to the Coalition through the Vehicle Probe Project. It was
  - Groundbreaking!
  - Transformative!
  - And it's enabling agencies to do good work.

- 10 years later (today) two new datasets are hitting the streets

- The Coalition is here to inform members about them

Today's Webinar will…

- Introduce these two new data sets:
  - Origin-Destination data (O-D data)
  - Trajectory Data (trips)
- Explore a national O-D study
- Discuss emerging TSMO and Planning Applications leveraging the OD and Trajectory data sets

Introductions

Joe Guthridge

HERE

Senior Product Manager

Rick Schuman

INRIX

Vice President, Public Sector

Dr. Sepehr Ghader

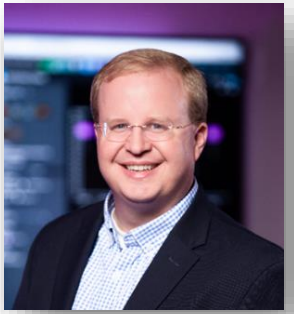
Maryland Transportation Institute

Research Scientist

Dr. Mark Franz

CATT Lab

Lead Transportation Analyst



Michael Pack

CATT Lab

Director

HERE TRAFFIC ANALYTICS TRIP DATA

Joe Guthridge
HERE

HERE Traffic Analytics Trip Data

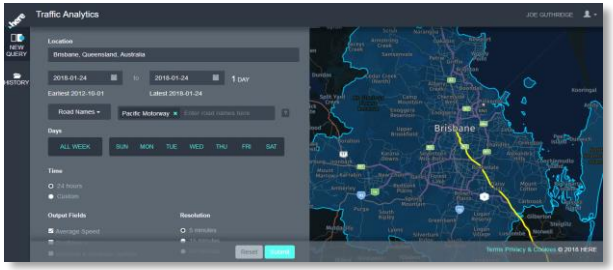
Joe Guthridge, Senior Product Manager

December 6, 2018

HERE Traffic Analytics Suite

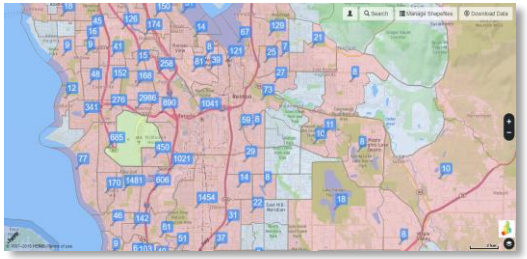
Speed Data

- Unmodeled historical road speeds derived from probe data
  - 5 years of history, updated daily
  - Delivered in bulk, via Web portal or API
  - Available in 57 countries
  - Truck specific option



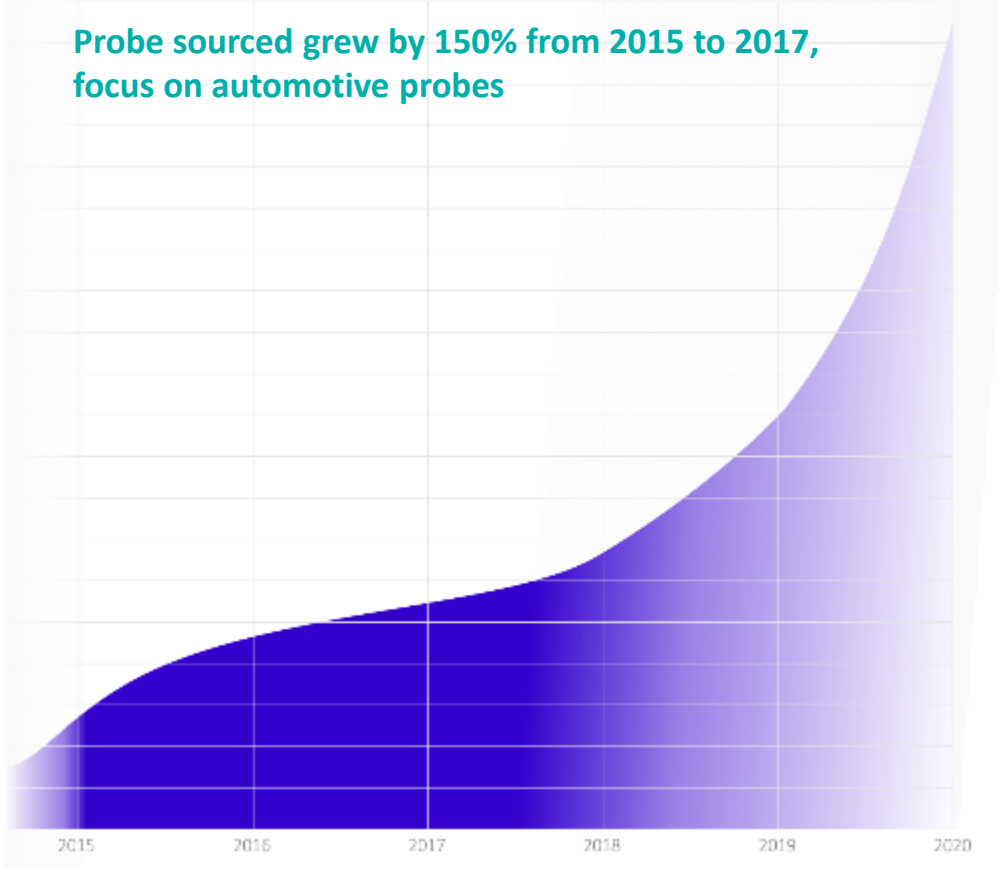
Trip Data

- Historical information on origination/ destination pairs and travel times derived from unmodeled probe data
  - Grid and TMC formats
  - 5 years of history, updated quarterly
  - Available in 10 countries



Substantial Investment in Sourcing and Processing Probes

Probe sourced grew by 150% from 2015 to 2017, focus on automotive probes



Current Probe Portfolio Highlights

- Well-diversified probe portfolio with 110+ probe providers covering 80+ countries
- Emphasizing OEM probes with focus on quality, not just quantity
- Large infrastructure investment in 2017 tripled processing capacity, now horizontally scalable

HERE Traffic Analytics Trip Data

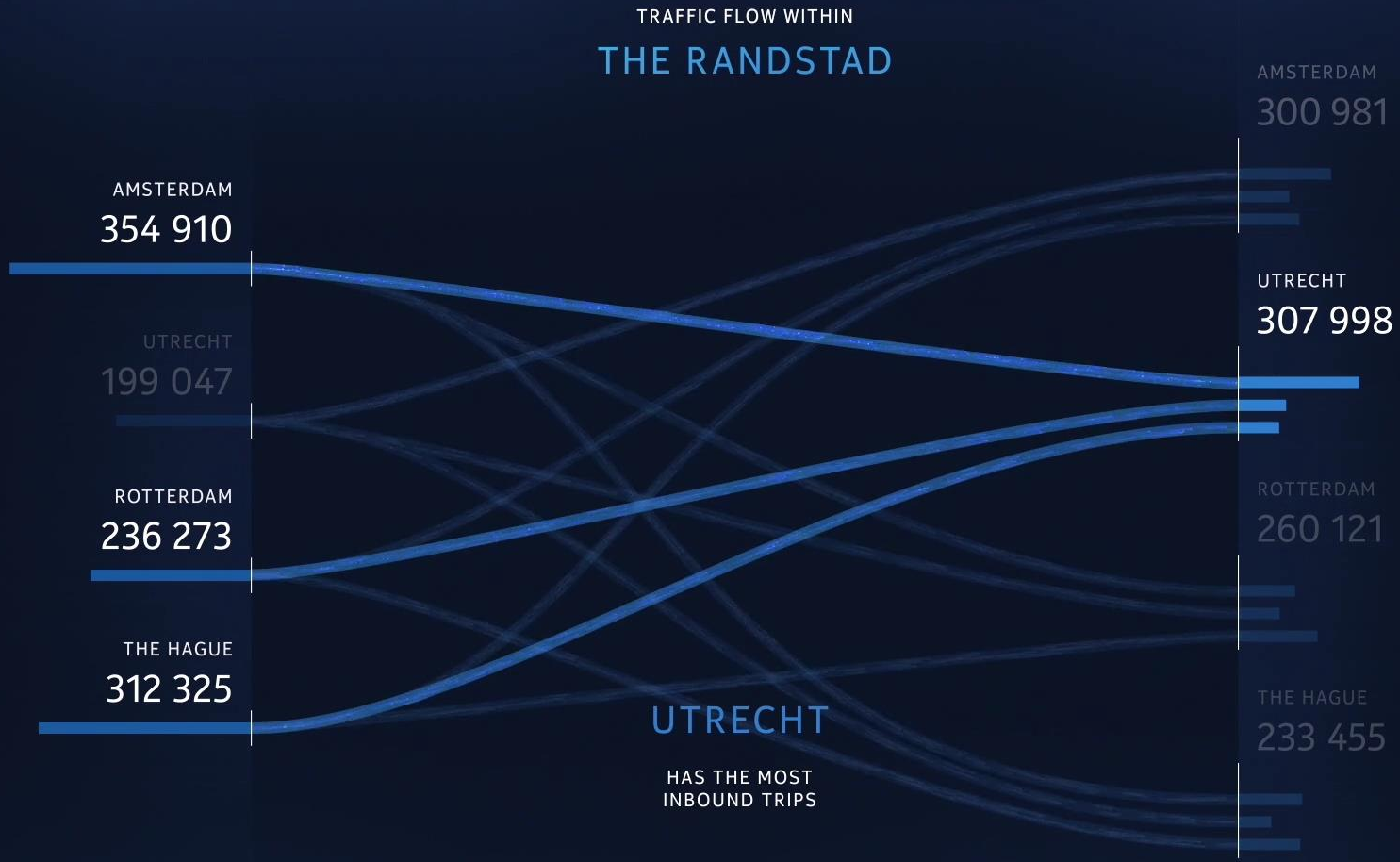
Historical origin/destination data

Understanding the movement of people through trips they take

- Medium- and long-term statistical data on observed trips
- OD matrix with counts and durations of trips based on GPS probes
- Trips are recognized by analysis of GPS probe traces, with privacy protection
- Road segment referencing option to quantify road usage purpose

Benefits

- Quicker and more cost effective than travel diaries or roadblocks
- Tailored to any use case's specific analysis zones
- Separate truck and passenger vehicle matrices available
- 5 years of history available, updated quarterly
- 1-hour granularity



https://vimeo.com/206024211/9a94f8e534

INTERNAL TRIPS MADE IN

AMSTERDAM

TIME

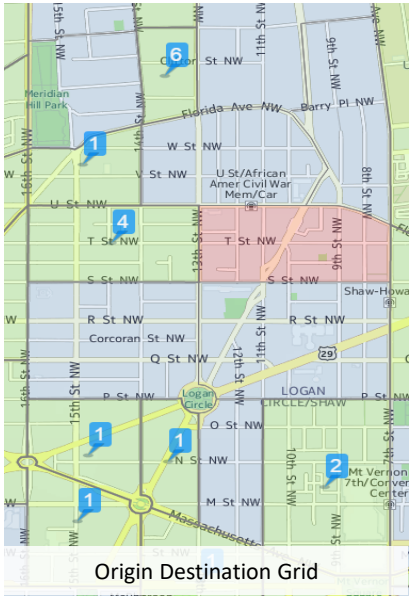
07:58

Two Trip Data Options

Grid Format

Where do cars come from and go to?

- Standard OD Matrix
- Average duration and count of trips between zones
- No road network references



Origin Destination Grid

TMC Format

Why is this road used?

- Extended matrix format tagged with standard road segment IDs (TMCs)
- Tied to the road network
- For each TMC crossed, gives the count and duration of trips between every pair of zones found
- Supports single gate analysis

Origin Destination TMC

Trip Data Protects Privacy

Probe data is anonymized, but trips need more protection

Individual trips cannot be provided

Trip Data protects privacy using *summarization*

- Never reports an O/D pair with fewer than **7** trips

Customers can configure the summarization to match their project

A single trip from one zone can be personally identified …

… if there's only one residence in that zone

Trip Data Statistics: Trips per year, by country

Including both low- and high-confidence trips

Country	2013	2014	2015	2016	2017	2018	Grand Total
ARG	22,719,167	18,755,268	21,156,182	26,901,511	35,329,025	16,684,368	141,545,521
AUS	43,596,241	47,405,930	50,923,390	50,623,390	55,233,548	29,310,352	277,092,851
BRA	520,900,511	509,569,168	537,258,280	498,628,148	513,840,926	271,007,102	2,851,204,135
CHL	3,831,173	2,729,571	2,021,111	1,716,117	4,238,761	2,742,958	17,279,691
DEU	285,429,405	433,322,757	475,299,919	364,067,384	361,411,925	176,481,197	2,096,012,587
FRA	503,184,386	625,763,559	759,232,441	510,718,077	543,155,771	279,951,874	3,222,006,108
GBR	208,197,772	205,974,413	227,821,126	149,980,847	202,037,445	119,035,937	1,113,047,540
NLD	141,679,285	183,933,460	233,843,922	135,156,646	186,006,478	123,751,299	1,004,371,090
NZL	6,136,674	6,214,192	5,237,217	5,332,418	5,223,245	2,497,585	30,641,331
USA	1,156,898,465	1,367,868,957	1,856,353,332	2,015,900,841	1,811,251,539	798,564,402	9,006,837,536
Grand Total	**2,892,573,079**	**3,401,537,275**	**4,169,146,920**	**3,759,025,379**	**3,717,728,663**	**1,820,027,074**	**19,760,038,390**

2018 statistics are through June 30

Trip Data availability in the I-95 Corridor Coalition Marketplace

The HERE "Core Bundle" What is included with your probe data procurement?

HERE Traffic Service /HERE Real Time Traffic delivers up-to-the-minute information about traffic conditions and incidents. It helps drivers by improving the accuracy of arrival times.

Traffic Analytics: Speed Data and Trip Data is a suite of data products that help enterprise and government customers make informed decisions such as road network performance.

HERE Location Platform (Application Programming Interfaces (APIs) and Software Development Kits (SDKs) for native mobile operating systems) delivers global location based services that can bring location-intelligent products and services to the market. HERE Platform features and functionalities are offered through seven key components: Maps, Geocoder, Direction, Places, Traffic, Transit and Visualization.

Questions?

Trip Data Fulfillment

Time Frame and options

Start Date (Jan 1 2013 or later)	
End Date (end of previous quarter, or earlier)	

☐ Include only high-confidence origins

☐ Include only high-confidence destinations

☐ Trucks only

☐ Passenger vehicles only

☐ Include external trips (which have only one end in any of the polygons in the shapefile)

Data Format

☒ Grid format (standard OD Matrix)

☐ TMC format (premium product)

Location

Shapefile (An ESRI format shapefile. The shapefile should contain a set of polygons to reference as origins and destination zones. See the Trip Data specification for specific requirements.)	Embed the shapefile here, *or* Enter a URL where the shapefile is available

Summarization

Select from these options to control how the data should be summarized. This will control the amount of data returned. See the specification for details. Hourly and Daily summarizations can be selected independently. Please consult the Trip Data specification for additional details.

Hourly summarization

Choose one of the following:

☐ Whole Day: no categorization of trips by the time of day at which they started.

☐ Parts of day: Overnight, AM Rush, Midday, PM Rush, and Evening (broken at 6AM, 9AM, 3PM, and 7PM local time) buckets for trip start.

☐ Hourly: trips are broken out by the hour of the day in which they start.

Daily summarization

Choose one of the following:

☐ Whole Dataset: one report for all days

☐ Monthly: one report for each month

☐ Weekday/ Weekend: summarized into one report for all weekdays, and another for all weekend days

☐ Day of week: summarized into one report for each day of the week: Sunday, Monday, …, Saturday

☐ None: each calendar day reported individually

Trip Data Example

ORIGIN	DESTINATION	WEEKDAYWEEKEND	DAYPART	COUNT	DURATION	DURATIONMEDIAN	DURATION95
1001	21005	WEEKDAY	PMRUSH	7	5379	5368	5863
1002	1008	WEEKDAY	EVENING	71	559	373	1071
1002	1008	WEEKEND	EVENING	25	630	488	1253
1002	1006	WEEKDAY	PMRUSH	17	274	166	604
1002	1006	WEEKEND	MIDDAY	9	142	145	215
1002	21005	WEEKDAY	MIDDAY	25	3480	3000	6650
1002	1007	WEEKDAY	PMRUSH	23	238	210	351
1002	1003	WEEKDAY	PMRUSH	15	1824	1343	2911
1002	1008	WEEKEND	MIDDAY	76	525	413	975
1002	1006	WEEKDAY	MIDDAY	15	144	131	200
1002	1002	WEEKDAY	PMRUSH	162	388	224	709
1002	EXTERNAL	WEEKDAY	MIDDAY	9	13791	10524	28438
1002	1008	WEEKEND	OVERNIGHT	25	571	479	1830
1002	1002	WEEKDAY	AMRUSH	63	466	258	2615
1002	1007	WEEKDAY	MIDDAY	27	231	196	330
1002	1006	WEEKDAY	OVERNIGHT	10	495	244	1964
EXTERNAL	1002	WEEKDAY	MIDDAY	9	12676	8815	30346
1002	1002	WEEKEND	EVENING	32	262	169	562
1002	1007	WEEKEND	PMRUSH	8	142	115	280

OVERVIEW OF INRIX TRAJECTORY DATA OFFERINGS & CAPABILITIES

Rick Schuman
INRIX

Overview of INRIX Trajectory Data Offerings and Capabilities

Rick Schuman

December 6, 2018

INRIX Trips

The industry's most comprehensive and flexible vehicle trip data set

- **Facilitates Tailored Analysis**
  - Use your analytical expertise to design studies your own way
  - Conduct studies more efficiently and affordably
  - No preset aggregations or algorithms to limit your analysis

- **Provides the Richest Trips Data Available**
  - Includes waypoints, data by vehicle, matrices and more
  - High resolution data points let you see each entire trip along specific roads
  - Includes access to freight data
  - Data can be segmented by vehicle type

INRIX Trips Provides A Variety of Insights

Efficiently plan and manage transportation initiatives by understanding the trips freight and people take

Transportation Demand Management

- Quantify the relative volume of travel in each target situation
- Determine the impact of project on level of service and other metrics

Internal/External Studies

- Understand how many pass-through trips are occurring
- Plan to minimize or attract more drivers to stop

Project Performance Evaluations

- Easily and cost-effectively evaluate the impact of decisions
- Show results of work in terms of travel time, trip speed and more

Congestion Studies

- Evaluate congested routes by times of day, types of day& more
- Realize the causes of congestion and plan to better optimize driving

- Origin-Destination Analysis
- Transportation Demand Management Modeling/ Travel Demand Modeling
- Congestion Studies
- Performance Measures
- Freight Movement
- Project Impact Studies
- Detour Planning
- Work Zone Analysis

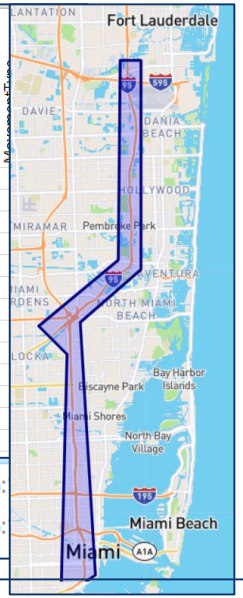
Representative Lists → Use Cases are being explored and expanded by agencies, consultants and academia

INRIX Trips Report

- Report created by querying for a particular geography (polygons) and time range
- Raw trips are delivered in large csv file, either through a download link/OneDrive or AWS S3 file transfer

TripId	DeviceId	ProviderId	Mode	StartDate	StartWDay	EndDate	EndWDay	StartLocLat	StartLocLon	EndLocLat	EndLocLon	IsStartHome	IsEndHome	GeospatialType	ProviderType	ProviderDrivingProfile	VehicleWeightClass	ProbeSourceType	OriginZoneName	DestinationZoneName	MultipleZones	MultipleCorridors	EndpointType	TripMeanSpeedKph	TripMaxSpeedKph	TripDistanceMeters
027e	589b	c3e87	1	2018-09-25T17:32:15.087Z	2	2018-09-25T18:39:11.333Z	2	25.734	-80.326	25.793	-80.19	FALSE	FALSE	EE	1	1	1	1			TRUE		0	17.81	32.27	19864.2
09a4	e2b0	c3e87	1	2018-09-25T19:07:25.860Z	2	2018-09-25T19:19:53.310Z	2	26.066	-80.177	26.062	-80.168	FALSE	FALSE	EI	1	1	1	1		I-95 Mian	TRUE		0	6.543	17.32	1358.49
0bf2	3d66	c3e87	1	2018-09-25T12:47:52.233Z	2	2018-09-25T13:24:32.837Z	2	26.111	-80.341	26.207	-80.109	FALSE	FALSE	EE	1	1	1	1			TRUE		0	57.35	115.2	35059.1
0ca3	79a7	c3e87	1	2018-09-25T14:43:09.110Z	2	2018-09-25T15:02:52.707Z	2	25.794	-80.187	25.782	-80.375	FALSE	FALSE	EE	1	1	1	1			TRUE		0	59.16	113.1	19449.4
0e87	68b9	45c48	1	2018-09-25T19:33:54.000Z	2	2018-09-25T19:40:09.000Z	2	26.082	-80.176	26.092	-80.132	FALSE	FALSE	EE	2	4	3	1			TRUE		3	46.69	81.41	4863.79
0f591	9f136	54229	1	2018-09-25T16:23:17.000Z	2	2018-09-25T16:57:49.000Z	2	25.899	-80.159	25.848	-80.282	FALSE	FALSE	EE	2	3	2	1			TRUE		3	29.33	65.23	16879.2
0fa6a	554e	82cec	1	2018-09-25T21:09:07.000Z	2	2018-09-25T21:20:52.000Z	2	25.75	-80.216	25.767	-80.183	FALSE	FALSE	IE	1	1	1	1	I-95 Miami-Dade		TRUE		0	21.87	79.2	4281.91
105e	737f	54229	1	2018-09-25T15:18:09.000Z	2	2018-09-25T18:04:19.000Z	2	26.092	-80.126	27.112	-82.348	FALSE	FALSE	EE	2	3	2	1			TRUE		3	109	123.5	301858
1193	526f	f4f6d	1	2018-09-25T16:42:18.000Z	2	2018-09-25T17:23:02.000Z	2	26.119	-80.133	25.959	-80.142	FALSE	FALSE	EE	1	1	1	1			TRUE		0	35.45	105.8	24065.1
1441	77aa	c3e87	1	2018-09-25T21:17:19.977Z	2	2018-09-25T21:44:35.353Z	2	25.698	-80.163	25.773	-80.221	FALSE	FALSE	EE	1	1	1	1			TRUE		0	27.88	75.69	12663.7
1907	3418	c3e87	1	2018-09-25T18:21:18.530Z	2	2018-09-25T18:36:59.373Z	2	25.781	-80.264	25.745	-80.173	FALSE	FALSE	EE	1	1	1	1			TRUE		0	47.42	82.66	12392.6
1925	939a	c3e87	1	2018-09-25T14:34:16.477Z	2	2018-09-25T14:55:41.337Z	2	25.813	-80.187	25.743	-80.229	FALSE	FALSE	EE	1	1	1	1			TRUE		0	31.05	80.45	11083
1afdf	c312	54229	1	2018-09-25T14:34:57.000Z	2	2018-09-25T15:52:00.000Z	2	25.808	-80.195	26.028	-80.208	FALSE	FALSE	IE	2	3	2	1	I-95 Miami-Dade		TRUE		3	38.82	101.2	49855.6

trips	Microsoft Excel Comma S...	2,318 KB	No	6,494 KB	65%	11/6/2018 5:
waypoints	Microsoft Excel Comma S...	11,354 KB	No	65,972 KB	83%	11/6/2018 5:



1 day - ~23K trips

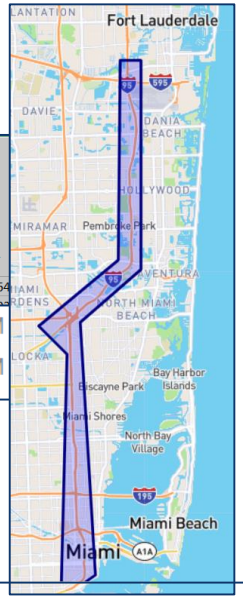
INRIX Trips Report – Waypoints

- The Waypoints for every Trip in a Trips Report are also available as a (large) separate .csv file
  - The Lat, Long, and Time of every point provides complete information about road segments travelled and speeds along the route
- Waypoints are extremely flexible -- new applications are constantly being developed (e.g., traffic signal analytics)

	TripId	DeviceId	ProviderId	Mode	StartDate	StartWDay	EndDate	EndWDay	StartLocLat	StartLocLon	EndLocLat	EndLocLon	IsStartHome	IsEndHome	GeospatialType	ProviderType	ProviderDrivingProfile	VehicleWeightClass	ProbeSourceType	OriginZoneName	DestinationZoneName	MultipleZones	MultipleCorridors	EndpointType	TripMeanSpeedKph	TripMaxSpeedKph	TripDistanceMeters
22847	02f2ef7(	dfcd184	66f041e	1	2018-09-25T13:38:49.049Z	2	2018-09-25T14:38:09.009Z	2	26.134	-80.423	25.892	-80.35	FALSE	FALSE	EE	2	3	2	1			TRUE		1	80.545	125.36	7964

trips	Microsoft Excel Comma S...	2,318 KB	No	6,494 KB	65%	11/6/2018 5:13 PM
waypoints	Microsoft Excel Comma S...	11,354 KB	No	65,972 KB	83%	11/6/2018 5:13 PM

TripId	WaypointSequence	CaptureDate	Latitude	Longitude	SegmentId	ZoneName	Frc	DeviceId	RawSpeed	RawSpeedMetric
02f2ef701dc458b7850ae06a35ebac8a	0	2018-09-25T13:38:49.049Z	26.134	-80.423				dfcd184239816f29fcf96cd9003df551	34	kph
02f2ef701dc458b7850ae06a35ebac8a	1	2018-09-25T13:39:49.049Z	26.13468	-80.42138				dfcd184239816f29fcf96cd9003df551	NaN	kph
02f2ef701dc458b7850ae06a35ebac8a	2	2018-09-25T13:39:59.059Z	26.13583	-80.42077	1422623326		3	dfcd184239816f29fcf96cd9003df551	51	kph
02f2ef701dc458b7850ae06a35ebac8a	3	2018-09-25T13:40:59.059Z	26.13918	-80.41833	1422575254		3	dfcd184239816f29fcf96cd9003df551	74	kph
02f2ef701dc458b7850ae06a35ebac8a	4	2018-09-25T13:42:00.000Z	26.1351	-80.40013	1422704843		1	dfcd184239816f29fcf96cd9003df551	124	kph
02f2ef701dc458b7850ae06a35ebac8a	5	2018-09-25T13:43:00.000Z	26.1304	-80.38048	1422631006		1	dfcd184239816f29fcf96cd9003df551	111	kph
02f2ef701dc458b7850ae06a35ebac8a	6	2018-09-25T13:49:03.003Z	26.10145	-80.25993	1422692704		1	dfcd184239816f29fcf96cd9003df551	137	kph
02f2ef701dc458b7850ae06a35ebac8a	7	2018-09-25T13:50:03.003Z	26.09647	-80.23978	1422692645		1	dfcd184239816f29fcf96cd9003df551	113	kph
02f2ef701dc458b7850ae06a35ebac8a	8	2018-09-25T13:51:03.003Z	26.09213	-80.22108	1422692779		1	dfcd184239816f29fcf96cd9003df551	122	kph
02f2ef701dc458b7850ae06a35ebac8a	9	2018-09-25T13:52:04.004Z	26.08473	-80.20202	1422637391		1	dfcd184239816f29fcf96cd9003df551	124	kph
02f2ef701dc458b7850ae06a35ebac8a	10	2018-09-25T13:54:05.005Z	26.0814	-80.16217	1422567625		2	dfcd184239816f29fcf96cd9003df551	127	kph

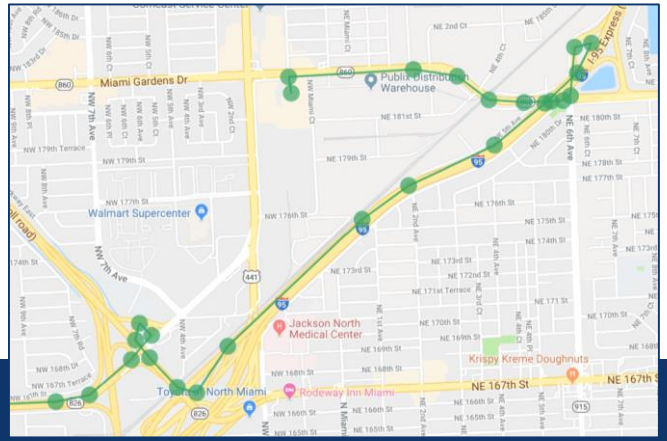


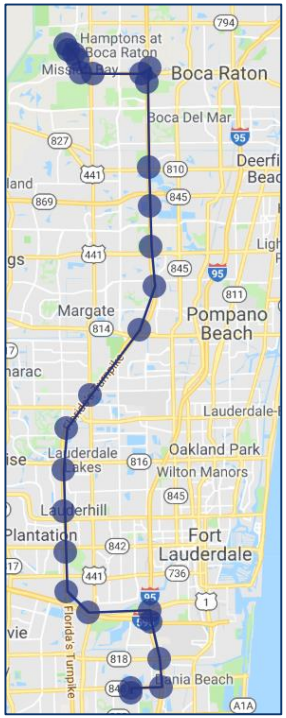
1 day - ~23K trips

INRIX Trips Report

Available Under VPP as an ‘Ancillary Product’

- Added to INRIX VPP Contract in February 2018
- Licensed by region and ‘date range’ – fee varies (fee table in VPP contract now)
  - Coalition agencies receive a discount via VPP Marketplace
- Data available from January 2014 to present
  - Minimum ‘date range’ for license under VPP is a month
- All trips starting, ending or going through region in data range are full captured/provided
- Data can be licensed purely historical, looking forward, or a combination
- VPP DUA governs use terms
  - Perpetual license/use
  - ‘One licenses, all can use’

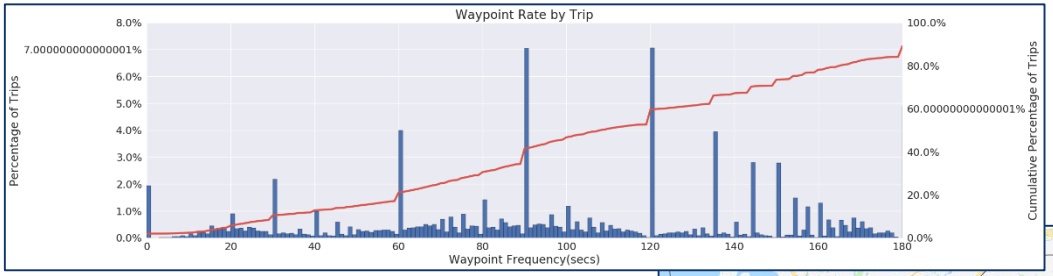


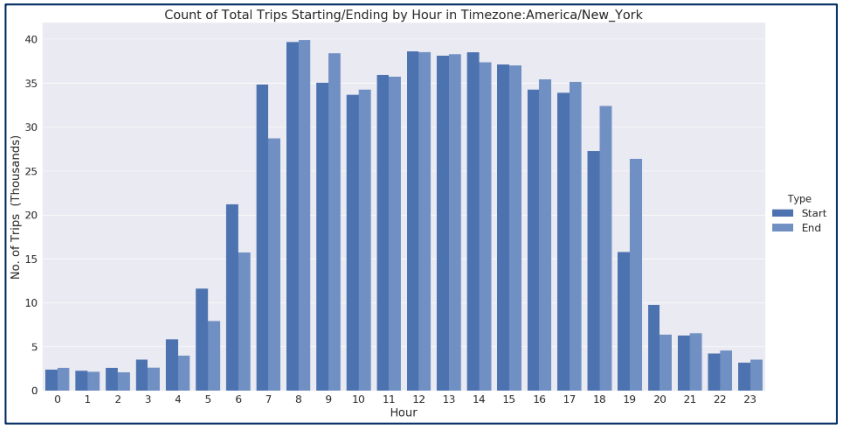


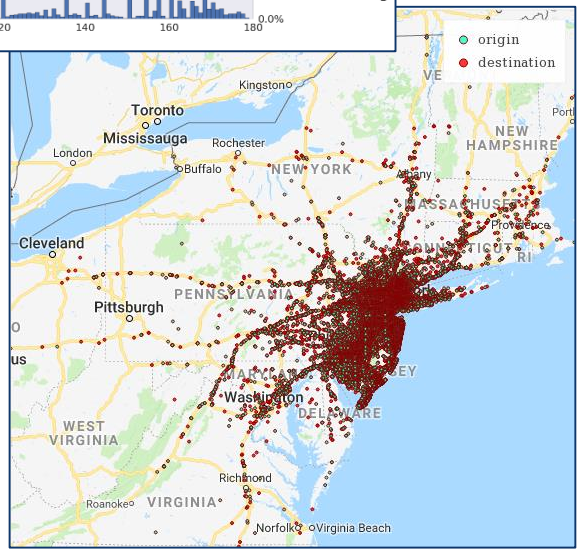
Typical Day of Trip Reports – Statewide New Jersey

Monday, March 26, 2018

- ~515,000 Trips over 24 hours
- Trips % by Vehicle Type:
  - 50% Passenger Vehicles
  - 35% Local Fleets
  - 15% Long-Haul Trucks

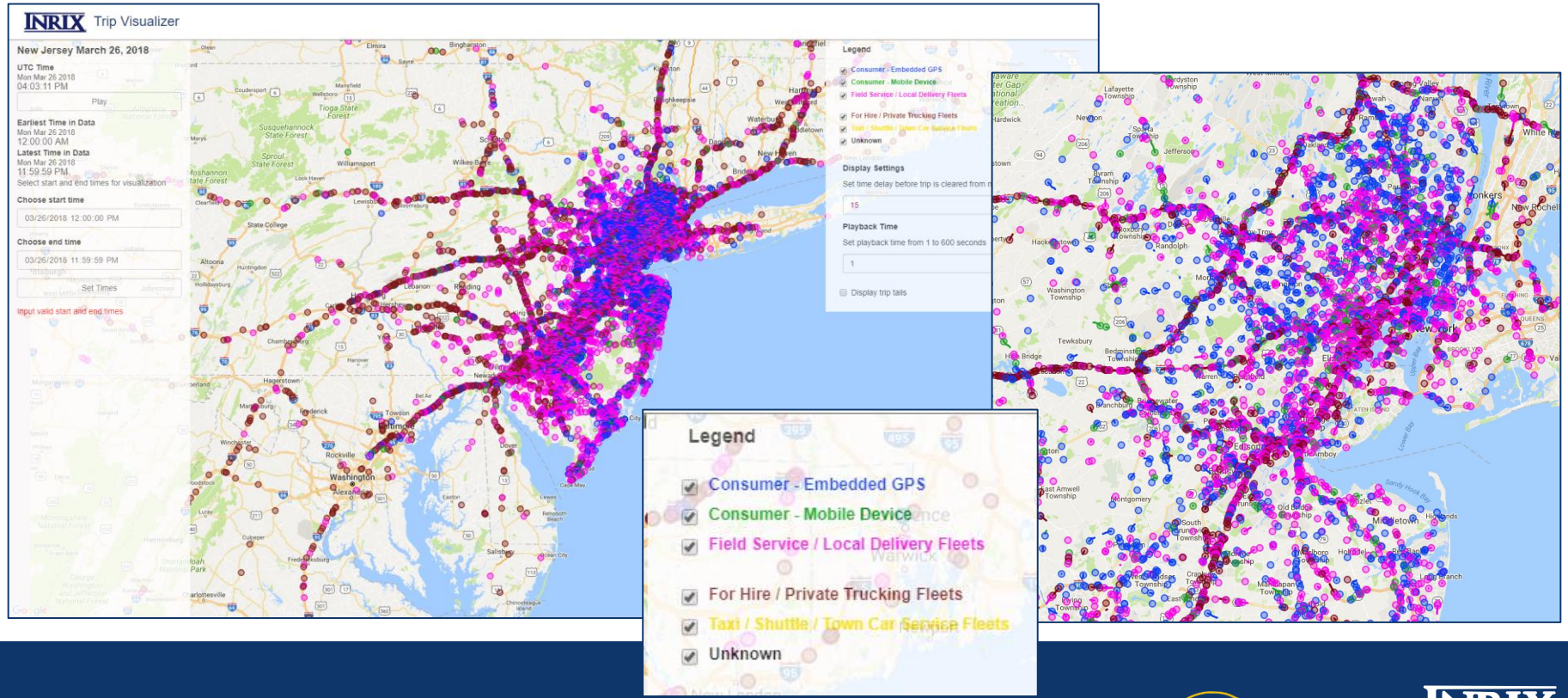






“Live” Probes, March 26, 2018

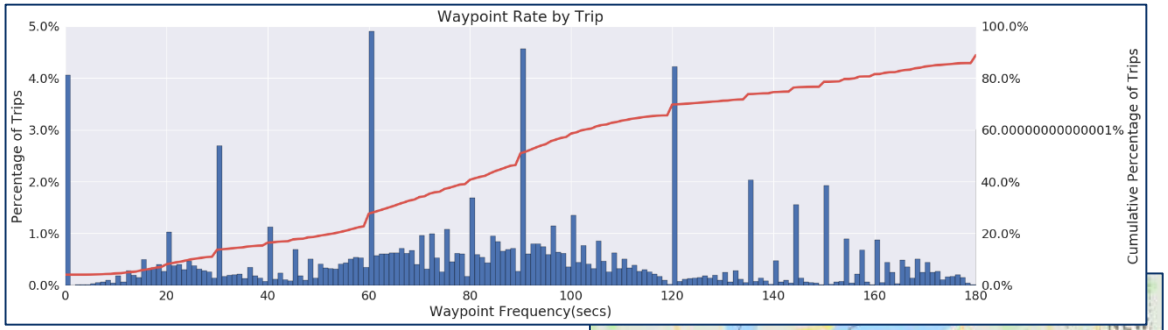
~Noon (left) and 4pm (right)

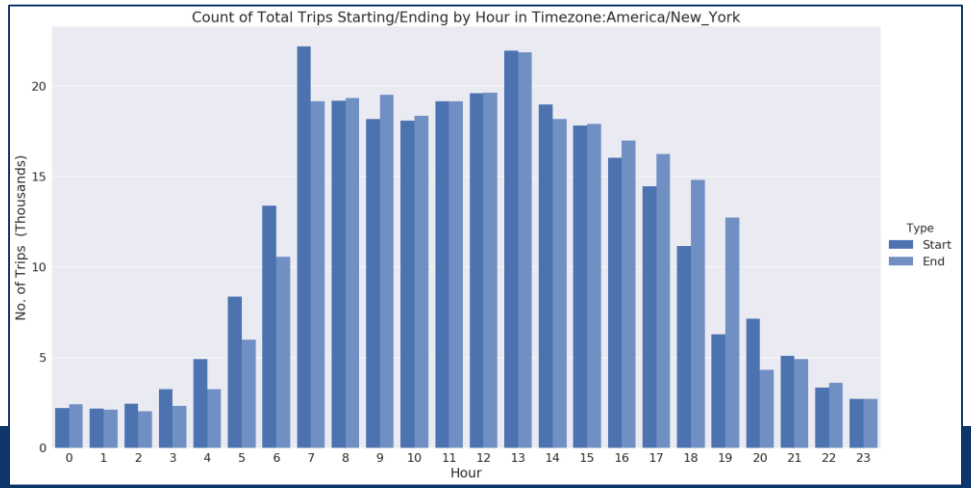


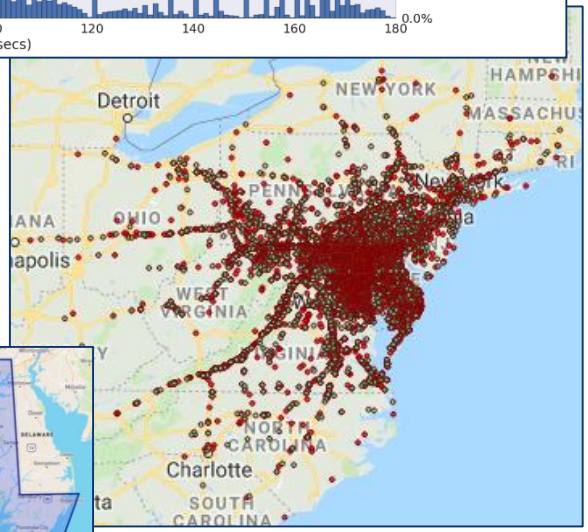
Typical Day of Trip Reports – Statewide Maryland

Thursday, May 17, 2018

- ~201,000 Trips over 24 hours
- Trips % by Vehicle Type:
  - 38% Passenger Vehicles
  - 41% Local Fleets
  - 21% Long-Haul Trucks

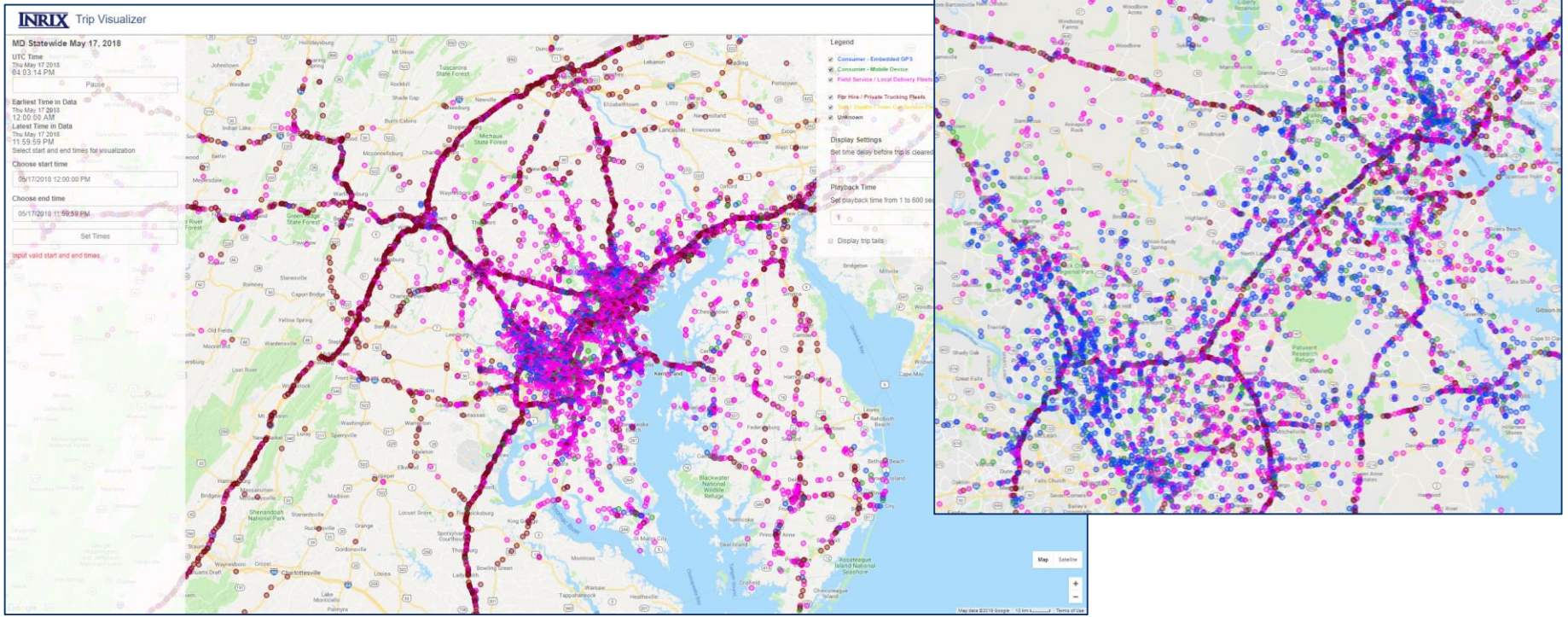






“Live” Probes, May 17, 2018

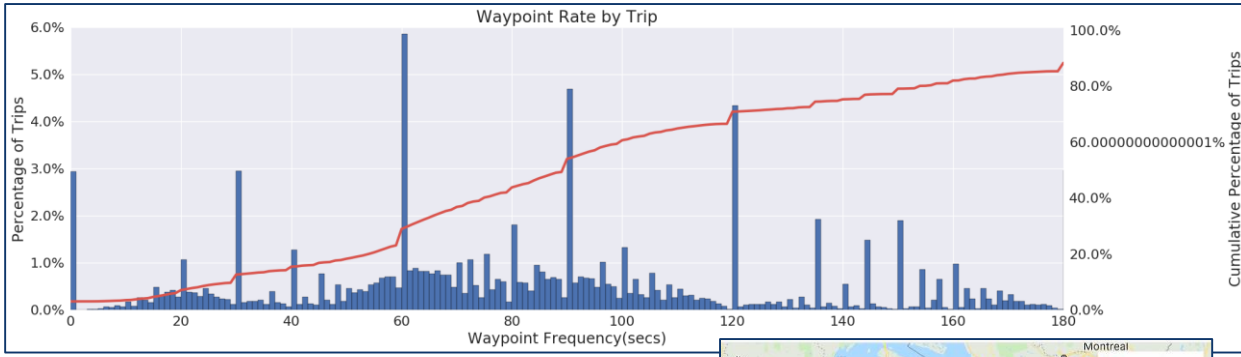
~Noon (left) and 4pm (right)

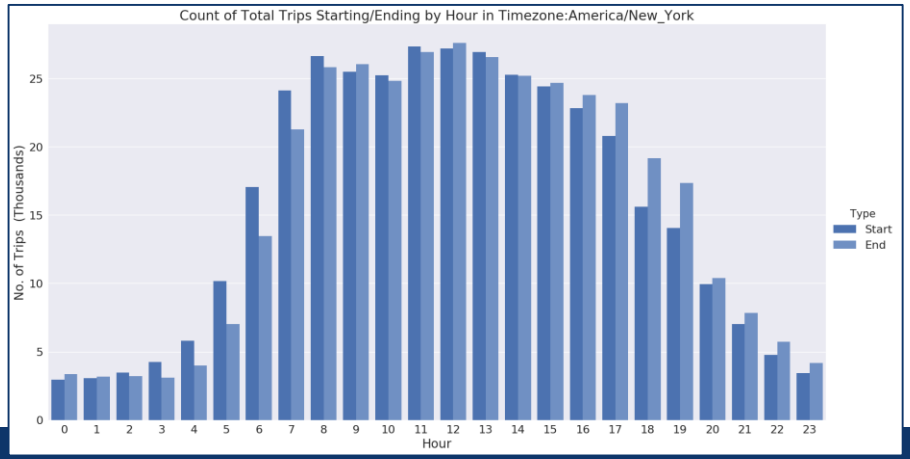


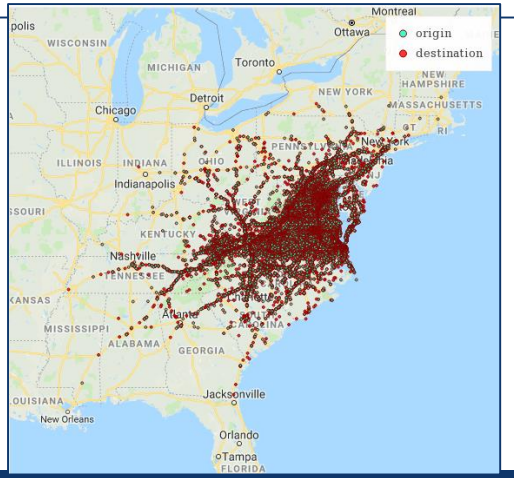
Typical Day of Trip Reports – Statewide Virginia

Thursday, June 21, 2018

- ~378,000 Trips over 24 hours
- Trips % by Vehicle Type:
  - 31% Passenger Vehicles
  - 38% Local Fleets
  - 31% Long-Haul Trucks

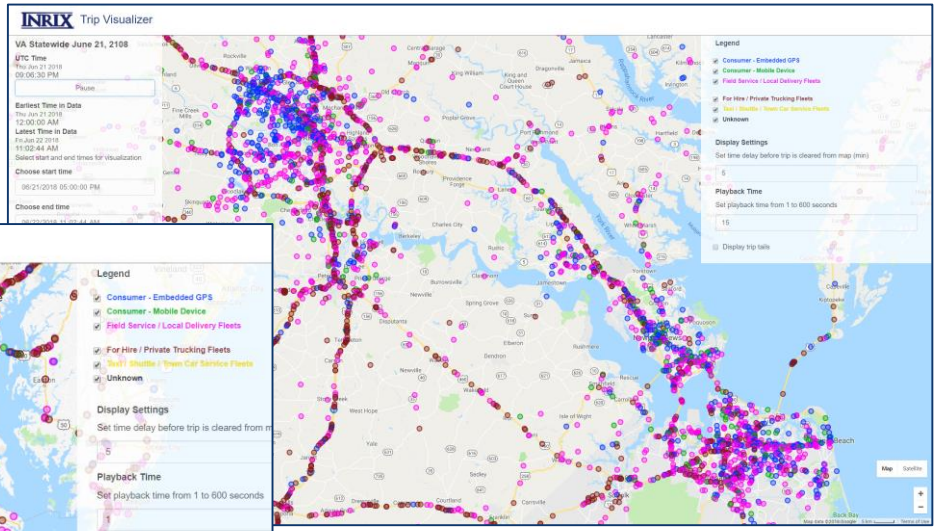


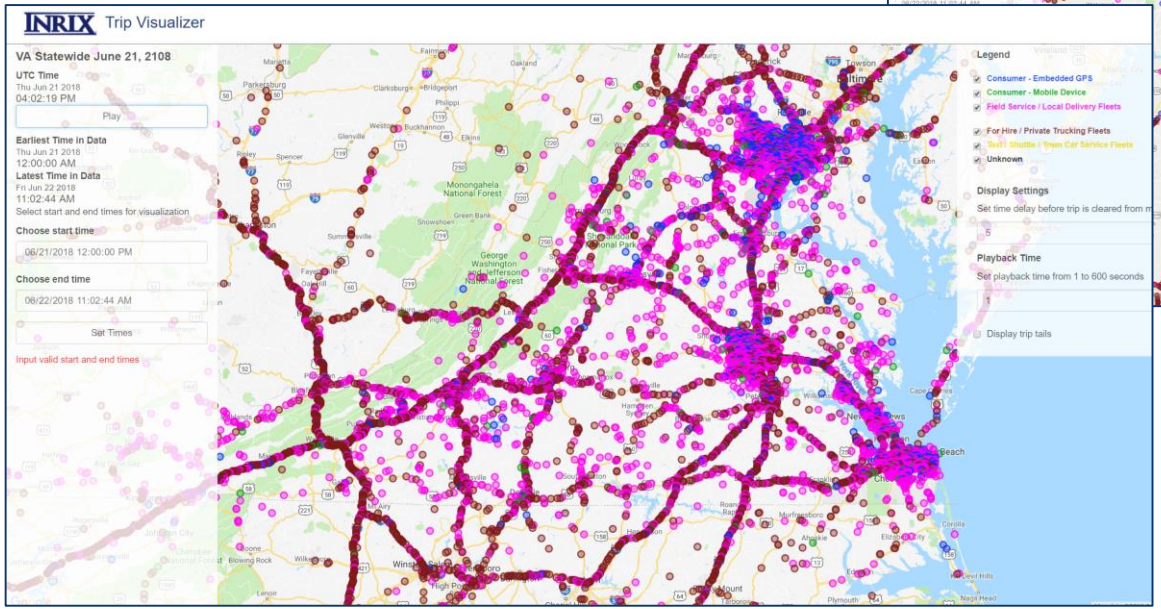




“Live” Probes, June 21, 2018

~Noon (left) and 5pm (right)

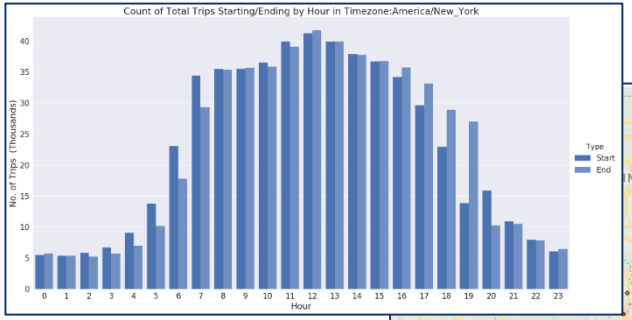


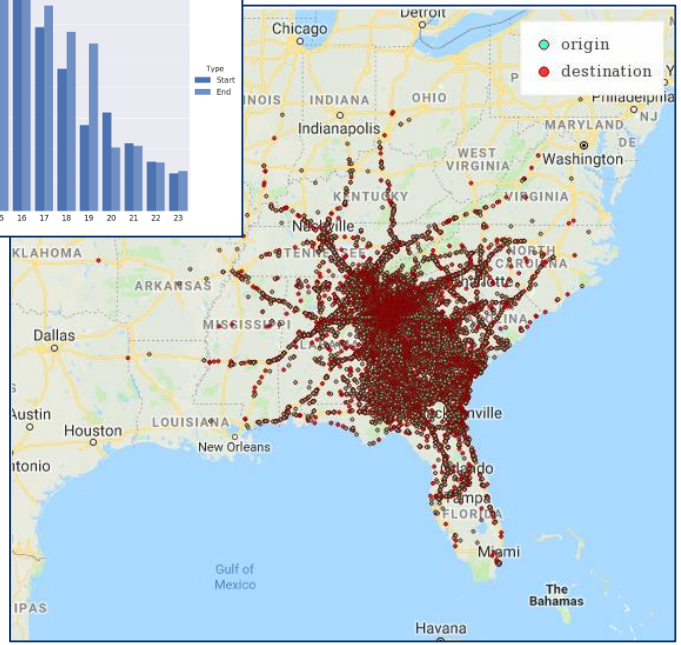


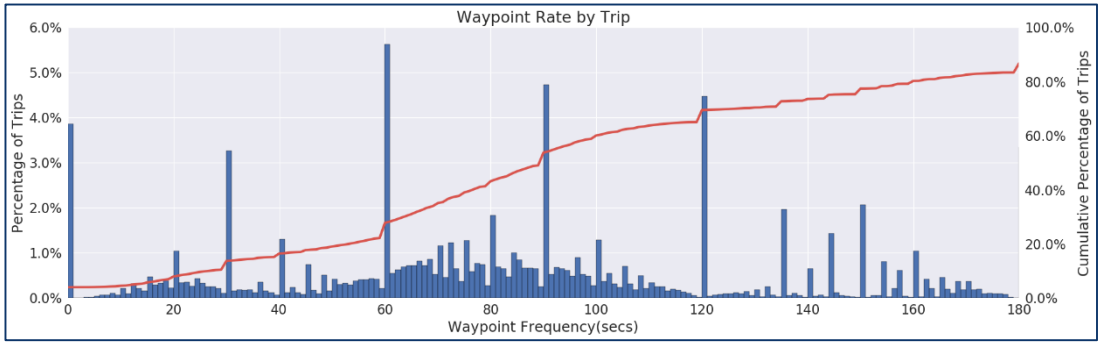
Typical Day of Trip Reports – Statewide Georgia

Thursday, April 19, 2018

- ~547,000 Trips over 24 hours
- Trips % by Vehicle Type:
  - 29% Passenger Vehicles
  - 32% Local Fleets
  - 39% Long-Haul Trucks

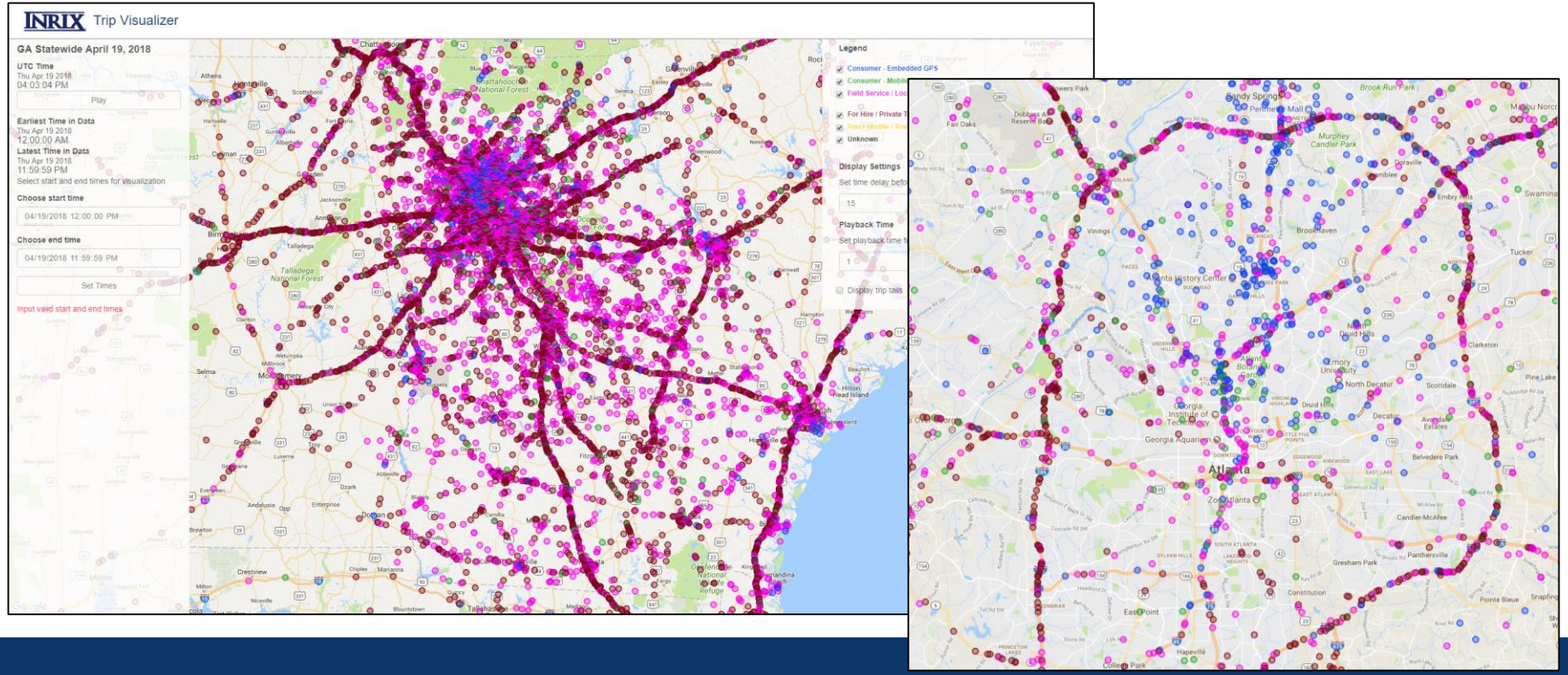




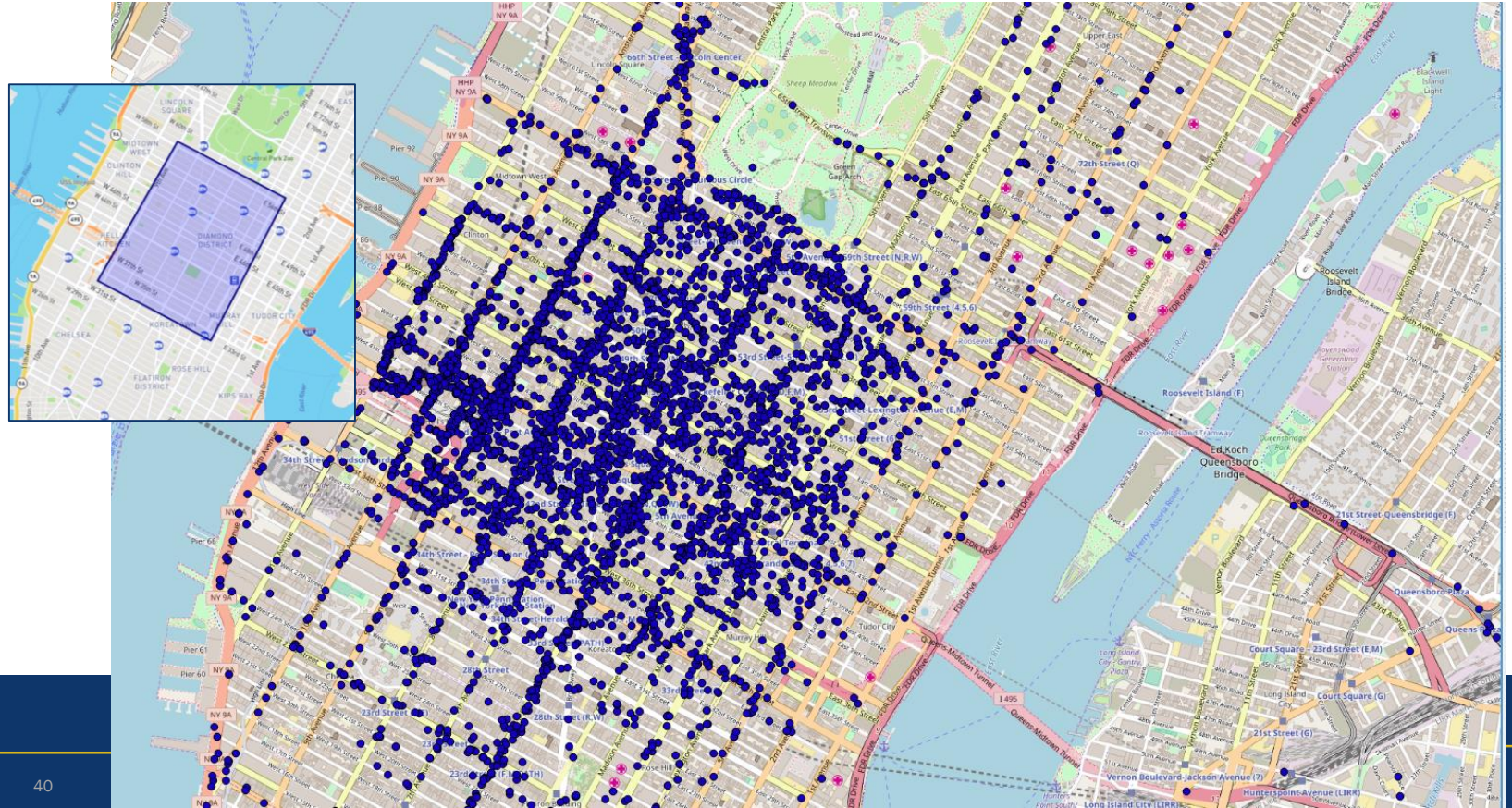


“Live” Probes, April 19, 2018

~ Noon (left), ~4pm (right)

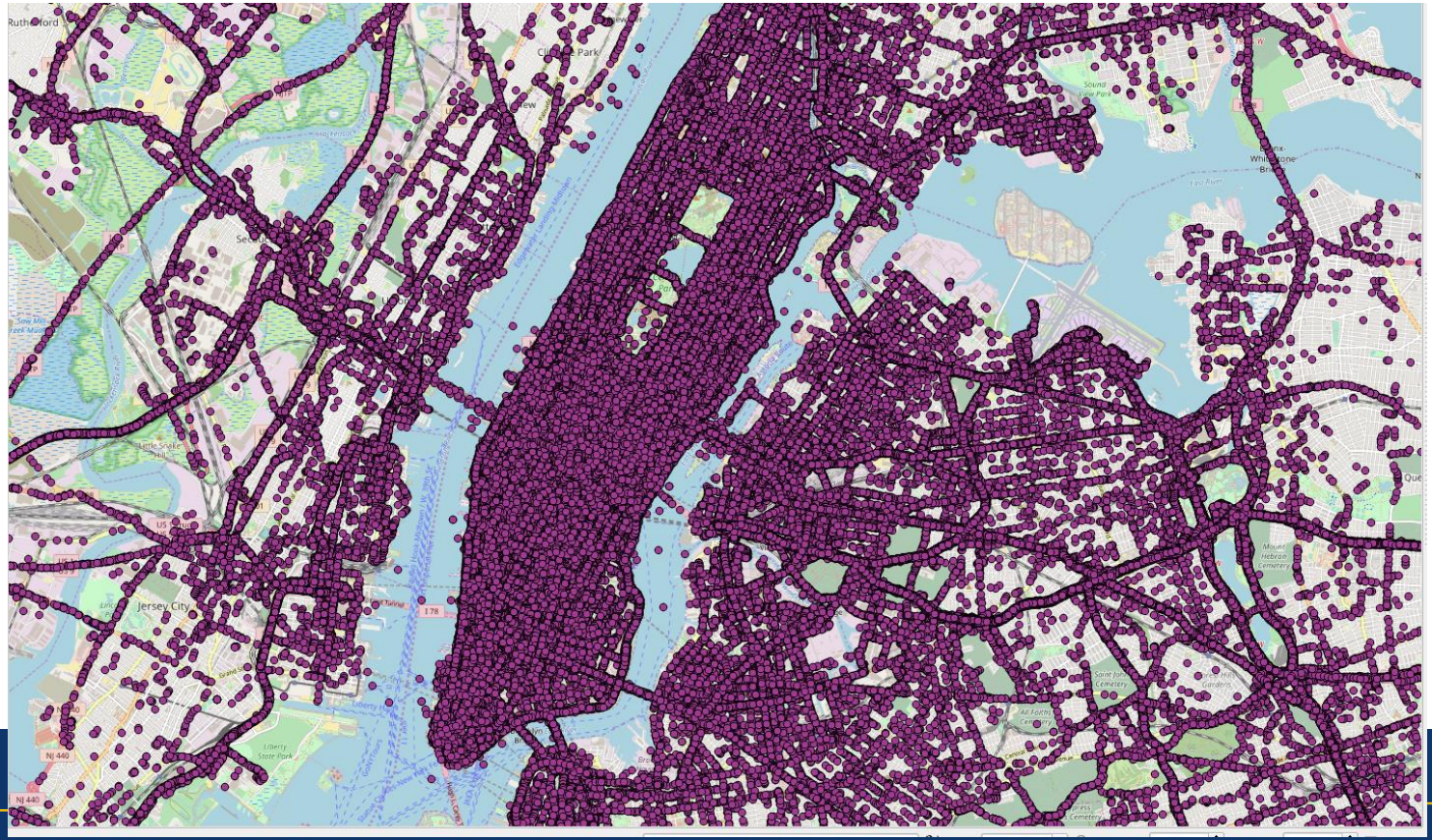


One Day of Freight Data in New York City
(Waypoints of Trips starting, ending or going through Midtown)

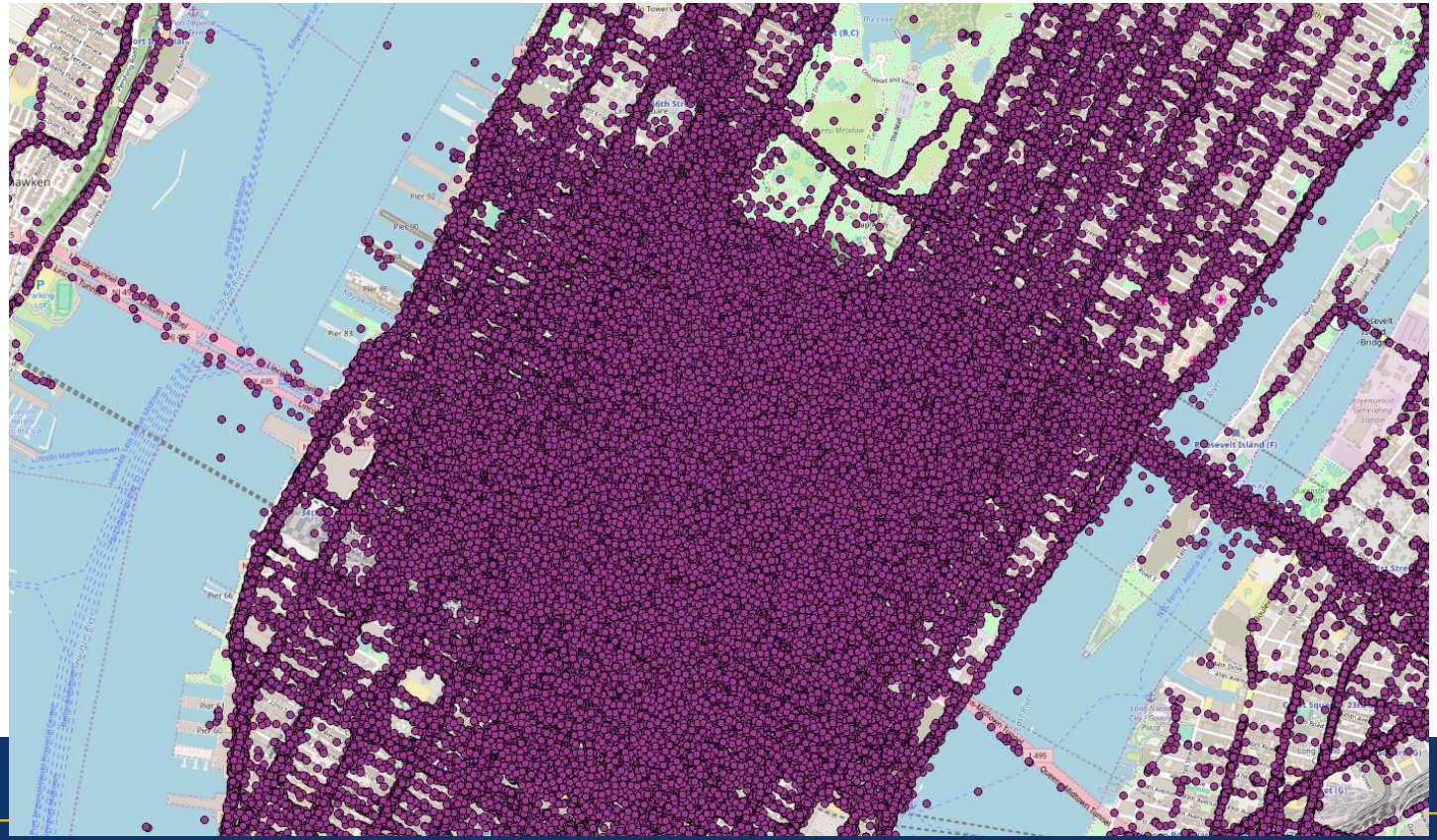


INRIX

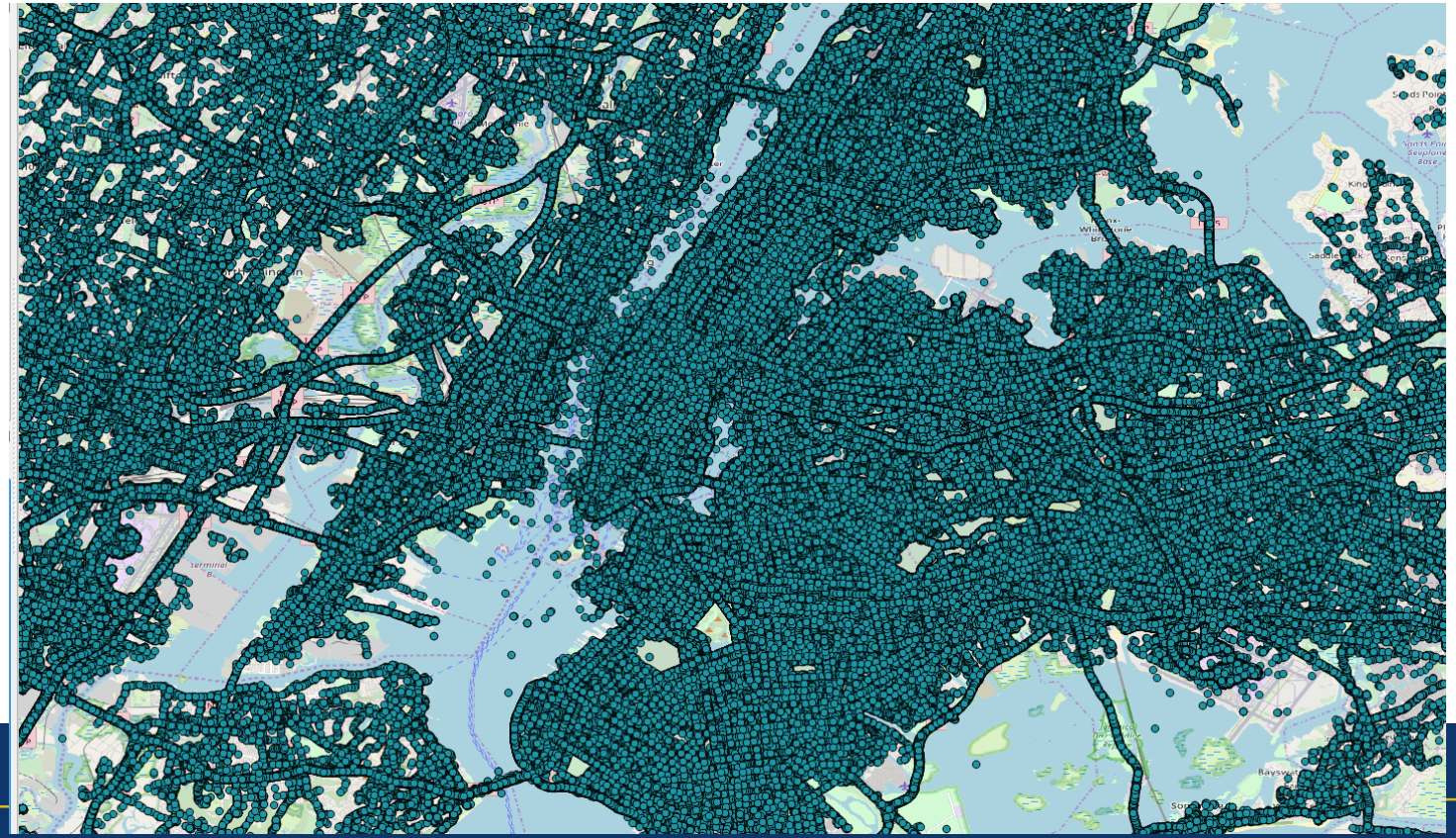
One Week of Freight Data in New York City



One Week of Freight Data in New York City – Zoomed Detail



One month of Freight Data in New York City



Some Example Uses

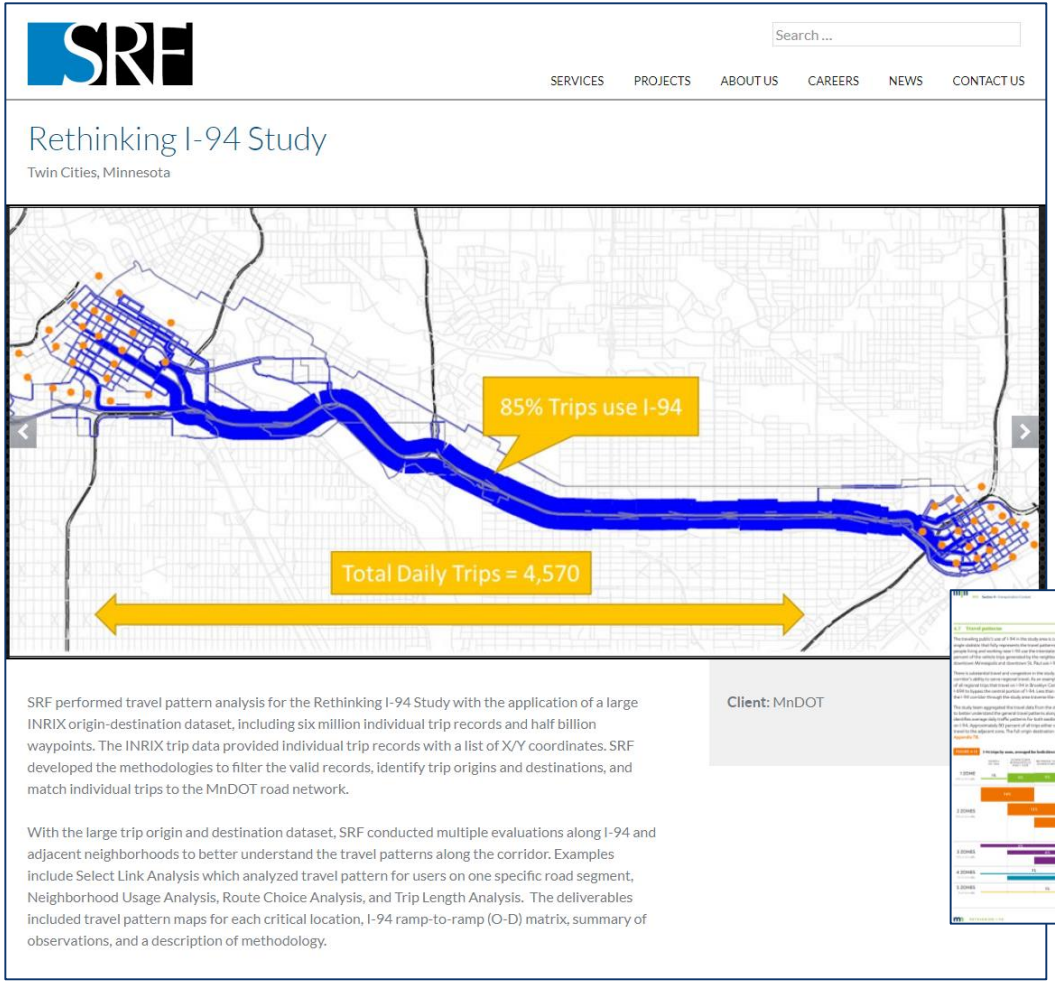
Use Case Example

Consultant: SRF Consulting

Client: Minnesota DOT

Links:

- http://www.dot.state.mn.us/I-94minneapolis-stpaul/vision.html
- https://www.srfconsulting.com/news/projects/rethinking-94-study/



Massive GPS Travel Pattern Data for Urban Congestion Relief in the Twin Cities

27th Annual CTS Transportation Research Conference

Paul Morris, PE
SRF Consulting Group, Inc.

November 3, 2016

http://www.cts.umn.edu/sites/default/files/files/sessions/paul-morris.pdf

Skycomp High-Resolution O-D Studies w/INRIX Trip Reports

More than a dozen studies completed in nine states

INRIX

Skycomp

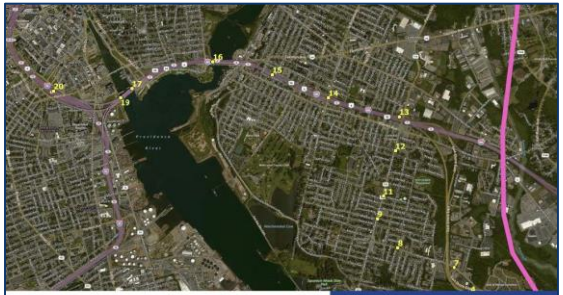
Skycomp and INRIX join forces to bring greater breadth and depth for traffic and origin destination analysis

With more than 300 million connected vehicles and devices providing real-time information on more than five million miles of road around the globe, INRIX has never offered a more detailed or accurate picture of traffic. With that said, some municipalities and transportation agencies are choosing to combine Time-Lapse Aerial Photography (TLAP) along with INRIX Trips to visually validate surveys as well as perform very granular, site-specific analysis that big data might not capture on its own.

More than 40 years ago, Skycomp pioneered aerial traffic surveys using helicopters and planes which led to Skycomp's TLAP technologies. Today, Skycomp leads the industry in traffic planning surveys and data analysis, including objectively verifiable traffic surveillance, monitoring, and analysis for use in origin-destination surveys, performance monitoring planning studies, and model calibration. One unique benefit of TLAP is that all collected metrics, including origin-destination, volumes, turning-movement counts, travel times/speeds and queue lengths are organically balanced as a result of their concurrent collection.

"While Skycomp is best known for TLAP, we are embracing other technologies to select the survey methodology best suited for our clients based upon their specific project requirements."

C. Alan Sharp, Director of Operations at Skycomp



Supportive validation for both INRIX and Skycomp.

However, some municipalities, especially those who don't reside near larger cosmopolitan areas, might wonder if INRIX Trips data has enough penetration to be truly representative of their survey area and populations. Skycomp provides the validation they need.

"We have found that overall market penetration rate for INRIX has been pretty consistent, and we measure that in a couple of different ways with hourly volume counts, with 24-hour volume counts, with monthly volume counts," said Billie Barnett, director of technical operations at Skycomp. "We have a few ways to look at the penetration rate, and we can view it from regional volume counts down to intersection turning-movement counts."

Rhode Island studies heavy truck traffic

Skycomp, in association with Louis Berger Group, conducted a study to measure and estimate the movements of heavy truck traffic throughout the state of Rhode Island and surrounding areas. Heavy trucks were studied at select-link sites at potential tolling locations, and within a client-provided Traffic Area Zone (TAZ) map. INRIX Trips data was used to cover the large area and time frame of the study, with Time-Lapse Aerial Photography (TLAP) used for validation purposes at selected sites. Additionally, classified vehicle counts were obtained from ground cameras so that origin-destination percentages from the INRIX data could be reliably expanded to volumes.

Go Granular

Skycomp TLAP surveys really shine at the level of granularity for specific locations. Yes, as the saying goes, "A picture is worth a thousand words" but in this case, exchange words for data points. For example, say you wanted to know how many vehicles are parking on the North side of a parking lot versus the West side? A TLAP survey could measure that very accurately and provide exact counts on specific vehicles, whereas INRIX Trips would just give you a number of vehicles entering and exiting, but couldn't tell you where they were parking. Here's another example: Imagine wanting to survey traffic on two ramp lanes that ran side by side. TLAP could identify where exactly those merging issues or chokepoints were originating, which due to the close proximity of the lanes, would be nearly impossible to measure from data pings alone.

Is TLAP and INRIX Trips right for you?

Do you have a traffic issue where time-lapse aerial photography and INRIX Trips data would that would give you the validity, granularity or broad geographic reach you need for your study?

Lean more about Skycomp at
www.skycomp.com
or contact Sharp@skycomp.com

Learn More about INRIX Trips at
INRIX.com/products/trips
or contact busdev@inrix.com

Connecticut Department of Transportation origin and destination survey.

Skycomp, in association with CDM Smith, worked with the Connecticut Department of Transportation to study origin-destination patterns along sections of I-84. The study acquired data from INRIX Trips and Skycomp's Time-Lapse Aerial Photography (TLAP) for validation purposes. Aerial photography cover two test periods of 120 minutes each (Friday morning and evening peak periods). From these surveys, data was extracted for peak directions and zones only, and origin-destination percentages were compared to INRIX origin-destination percentages.

Since the O-D percentages for the sampled areas/time periods/directions compared favorably, CDM Smith had the confidence to proceed with phase two of the study, which involved fully exploiting the INRIX Trips database to acquire O-D percentages for the entire desired survey area, for three hours in the morning and evening, in both directions. In some instances, aerial photography was used to assist in granular areas where it was difficult to determine vehicle behavior with INRIX data alone.

INRIX

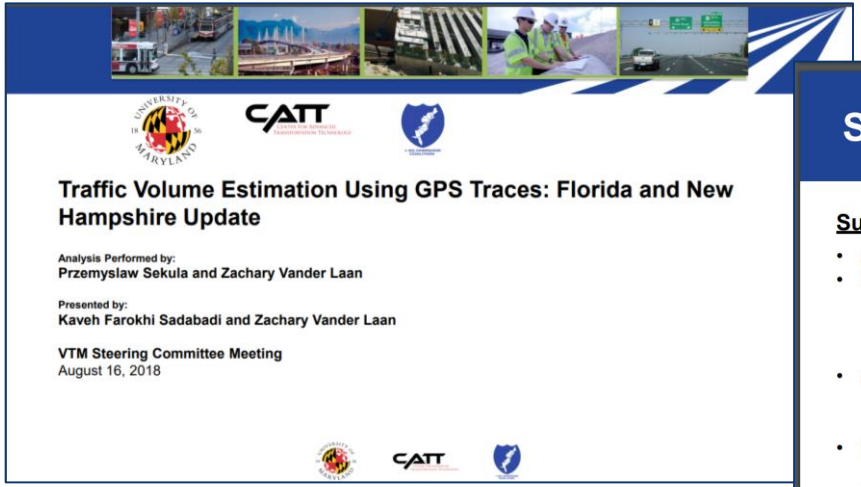
Links:

- http://inrix.com/wp-content/uploads/2018/06/INRIX-Skycomp-Case-Study.pdf
- http://www.skycomp.com/index.php/survey-types/mobility-audits

INRIX

Generating Scalable Volume Counts Using Trip Reports

Results from I-95 CC's 'VTM' Project

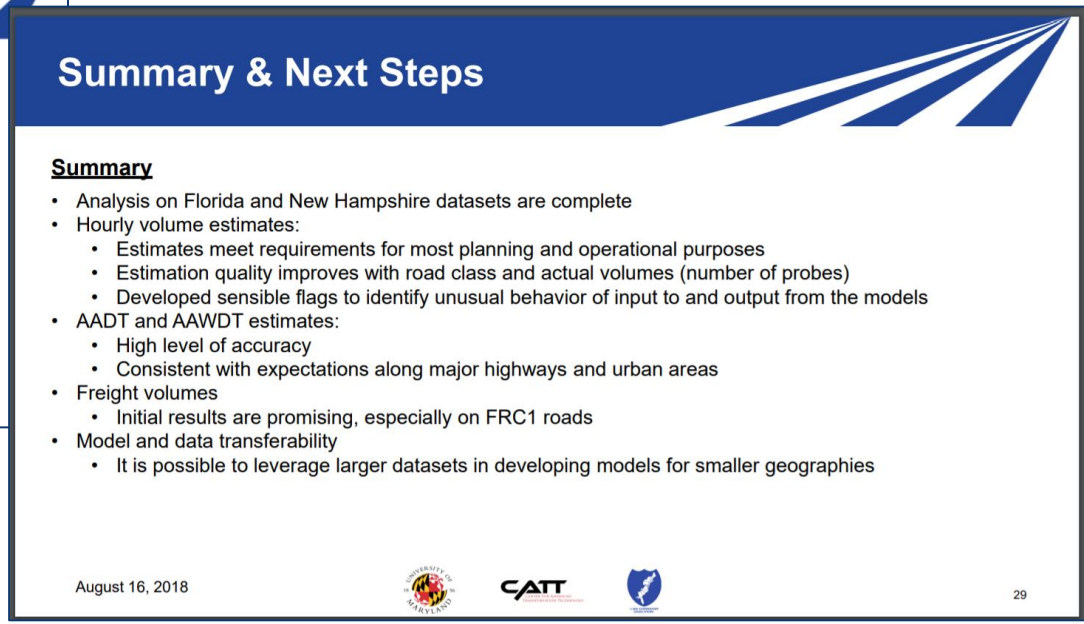


Traffic Volume Estimation Using GPS Traces: Florida and New Hampshire Update

Analysis Performed by:
Przemyslaw Sekula and Zachary Vander Laan

Presented by:
Kaveh Farokhi Sadabadi and Zachary Vander Laan

VTM Steering Committee Meeting
August 16, 2018



Summary & Next Steps

Summary

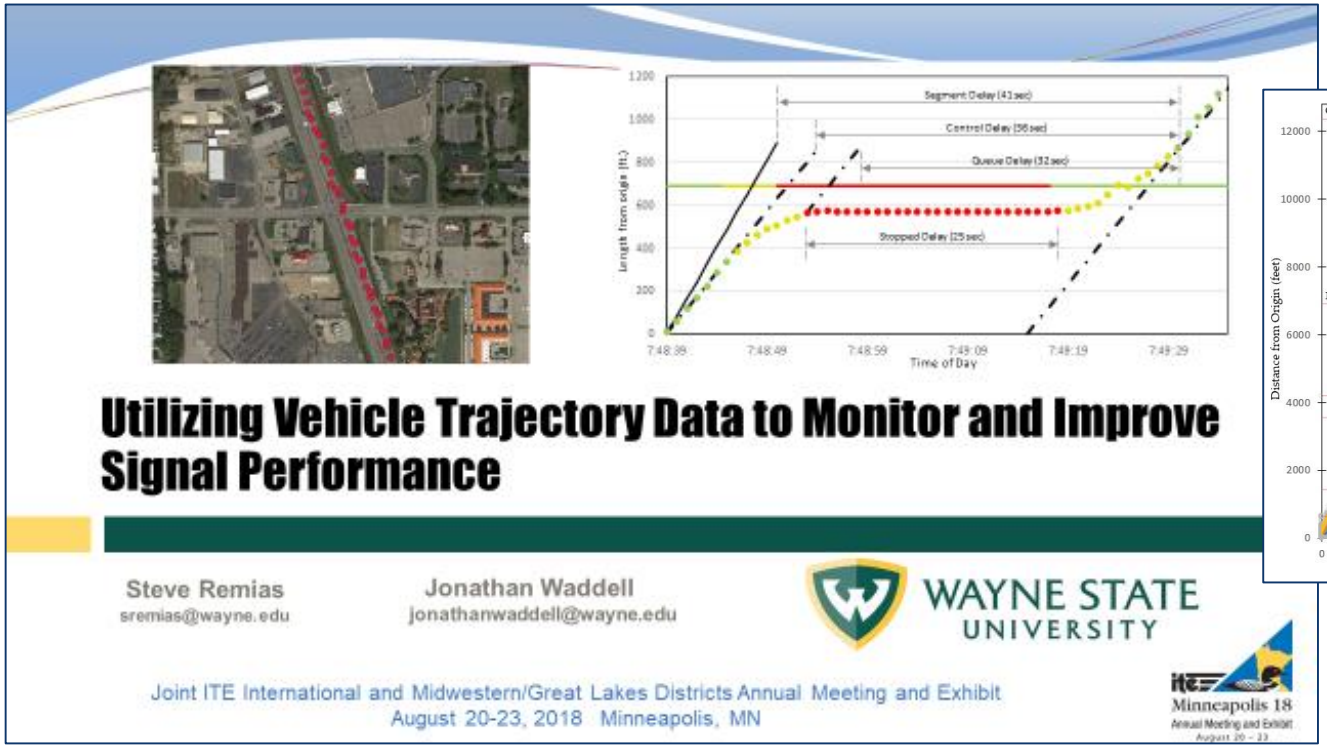
- Analysis on Florida and New Hampshire datasets are complete
- Hourly volume estimates:
  - Estimates meet requirements for most planning and operational purposes
  - Estimation quality improves with road class and actual volumes (number of probes)
  - Developed sensible flags to identify unusual behavior of input to and output from the models
- AADT and AAWDT estimates:
  - High level of accuracy
  - Consistent with expectations along major highways and urban areas
- Freight volumes
  - Initial results are promising, especially on FRC1 roads
- Model and data transferability
  - It is possible to leverage larger datasets in developing models for smaller geographies

August 16, 2018

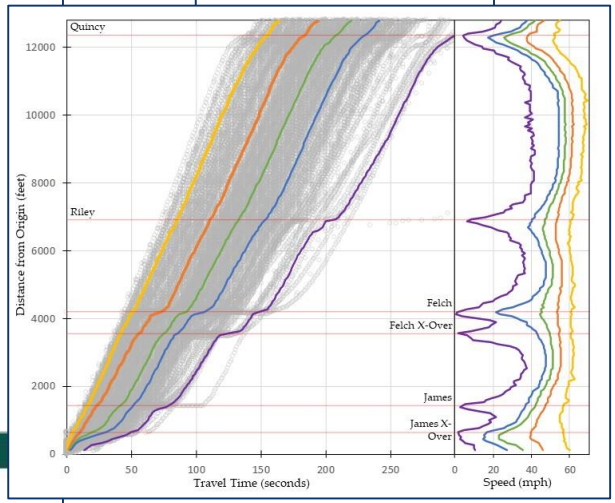
29

http://i95coalition.org/wp-content/uploads/2015/02/I95CC-VolTurnMvmt-SCmtg8-16Aug2018-FINAL.pdf?x70560

Signal/Arterial Performance Assessment



Vehicle Speeds Along a Corridor



https://www.dropbox.com/s/dphdpllbo2935x8/20181004_INRIX_AVL.pptx?dl=0

In Summary…

- INRIX Trips Report are here to help…
- Directly measured dataset (think large-scale ‘floating car’ runs)…
- Data available from January 2014 forward…
- Across the US (and many other countries)…
- Lots of uses already demonstrated…but still lots of innovation still possible…
- Can be licensed under I-95 Vehicle Probe Project marketplace…
- At best possible fee and with liberal VPP use terms…
- With lots of potential assistance from consultants, universities and solution providers if desired…
- Can get started today!

Contact/Questions?

Rick Schuman

rick@inrix.com

407-572-5584

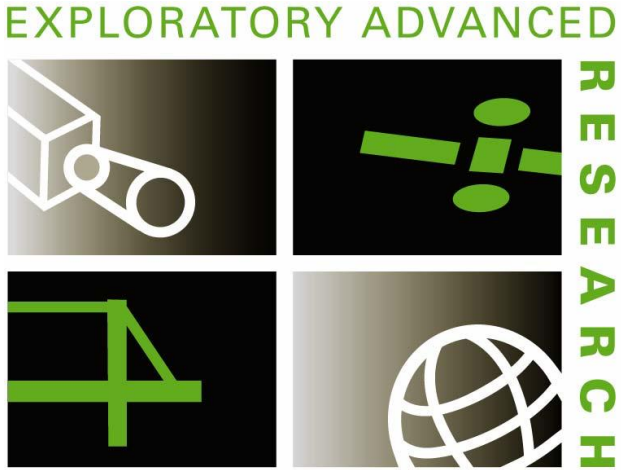
DEVELOPING NATIONAL, MULTI-MODAL ORIGIN-DESTINATION PRODUCTS

Dr. Sepehr Ghader
UMD Maryland Transportation Institute

U.S. Department of Transportation Federal Highway Administration

A FHWA Exploratory Advanced Research Program Project

Data Analytics and Modeling Methods for Tracking and Predicting Origin-Destination Travel Trends based on Mobile Device Data



by
Maryland Transportation Institute
University of Maryland

MARYLAND TRANSPORTATION INSTITUTE

Project Team

University of Maryland

- Project PI

  Lei Zhang

  Herbert Rabin Distinguished Professor

  Director, Maryland Transportation Institute

  301-405-2881, lei@umd.edu
- Project Manager

  Sepehr Ghader

  Research Scientist

  Maryland Transportation Institute

  703-638-4046, sghader@umd.edu
- UMD Centers on the Project Team

  National University Transportation Center

  Center for Geospatial Information Sciences

State and MPO Agency Partners

- Baltimore Metropolitan Council
- Maryland Department of Transportation State Highway Administration

Data Provider Partners

- AirSage
- INRIX and StreetLight

Project Objectives

- Explore the potential of producing person travel origin-destination (OD) tables from passive-collected mobile device data (e.g., cell phone, GPS, Location-Based Services(LBS)) at national, state, and MPO levels.
- Explore the potential of segregating person travel OD data by mode, purpose, time period, socio-economic and demographical variables.
- Explore the potential of generating truck travel OD tables that are segregated by time period and vehicle weight class.
- Help the users better understand the mobile data black box.

Passively Collected Data Sources

Cell Phone

- Call Detail Record (CDR)
- Triangulation positioning

GPS

- In-vehicle (driving trips only)
- In-Phone Embedded GPS and accelerometer

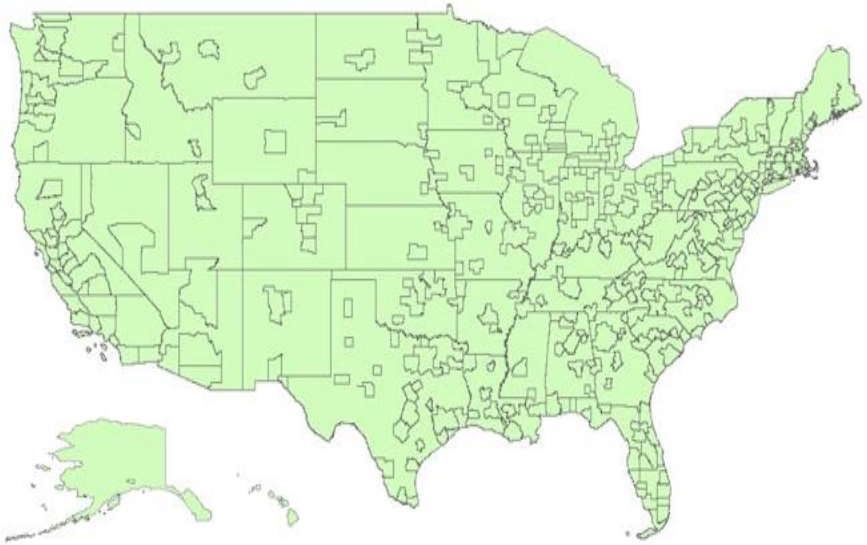
Location-based Services (LBS)

- From smartphone apps that use location-based services

Research Products

- A data sandbox to allow data users to better understand mobile device data and improve their confidence and appreciation of relevant data products
- Open-source algorithms for trip end identification and for the imputation of trip purpose, mode, socio-economic and demographical variables.
- Open-source algorithms for correcting sample bias and for sample extrapolation based on mobile device data.
- Validation of OD products.
- National person-level microsimulation travel demand model calibrated based on mobile device OD data.

Zone Structure for OD Products



National OD
Metropolitan Statistical Area Zones

State/MPO OD
TAZ or Census Block Group Zones

National OD Products

Mobile Device Data Source	Cellphone	GPS	LBS
Data Provider	AirSage	INRIX data	StreetLight
National-Level OD Product	Yes	Yes	Evaluation Only
National-Level Product Detail	2017 year-long OD by socio-demo., mode, month of year, time of day, for MSA zones	2017 year-long OD for car and trucks and by socio-demo., month of year for MSA zones	While OD tables can be provided, they will be used for UMD evaluation purpose only.
National-Level OD Prediction	The 2017 base year OD tables will be employed to calibrate a person-level microsimulation-based U.S. national travel demand model that can predict future year OD tables.		

2017 National OD Product Details

- **Study area**
  - 400+ MSA-MSA zones covering the entire nation
- **Study period:**
  - Entire 2017
- **Day types**
  - Average weekday: Monday to Friday
  - Average weekend: Saturday and Sunday
- **OD tables are separated by socio-demographic groups, trip purpose, modes, and month of year**
- **All trips longer than 50 miles are included in the current national OD tables, which can be refined.**

Sample State/MPO-Level OD Products

Mobile Device Data Source	Cellphone	GPS	LBS
Data Provider	AirSage	INRIX data	StreetLight
MPO-Level OD Product	Yes	Yes	Yes
MPO-Level OD Product Detail	2017 OD by purpose, socio-demo., mode, month of year, time of day.	2017 OD for car and truck, by purpose, socio-demo., month of year, time of day.	2017 OD by purpose, socio-demo., mode, month of year, time of day.
Micro-Level Location Data	Yes	Yes	Yes
Micro-Level Data Details (project team access only)	Sample of location points and time stamps for cell phones	Sample of Original GPS location points for all trips.	Sample of location points from raw LBS data provider.

2017 State/MPO OD Product Details

- Study area
  - 2922 TAZ covering the entire Baltimore MPO area
- Study period:
  - Entire 2017
- Time-of-day: selected to be compatible with BMC model
  - Morning peak: 6 am to 10 am
  - Mid-day: 10am to 3pm
  - Afternoon peak: 3 pm to 7 pm
  - Night: 7 pm to 6 am
- Day types
  - Average weekday: Monday to Friday
  - Average weekend: Saturday and Sunday
- OD tables are separated by socio-demographic groups, trip purpose, modes, and month of year.

OD Product Validation

Independent Data for OD Product Validation

- Airline OD Survey (DB1B)
- Airport ground access survey
- Third party data and previous FHWA data on intercity travel by air, train, bus and driving modes
- 2017 National Household Travel Survey (NHTS)
- Statewide and MPO travel surveys and American Community Survey (ACS)
- Freight Analysis Framework (FAF) data
- Monthly VMT and AADT trends
- Traffic counts
- Etc.

Validation of Data Algorithms

- **UMD team has evaluated different options to collect micro-level ground truth data including:**
  - **Raw data from cell phone, GPS and LBS**
  - **Location and time stamps**
  - **Reported trip purpose**
  - **Reported trip mode**
  - **Reported socio-demographic characteristics**
  - **Etc.**
- **Micro-level data will be used in the validation of imputation, weighting, integration, and consistency assurance algorithms**

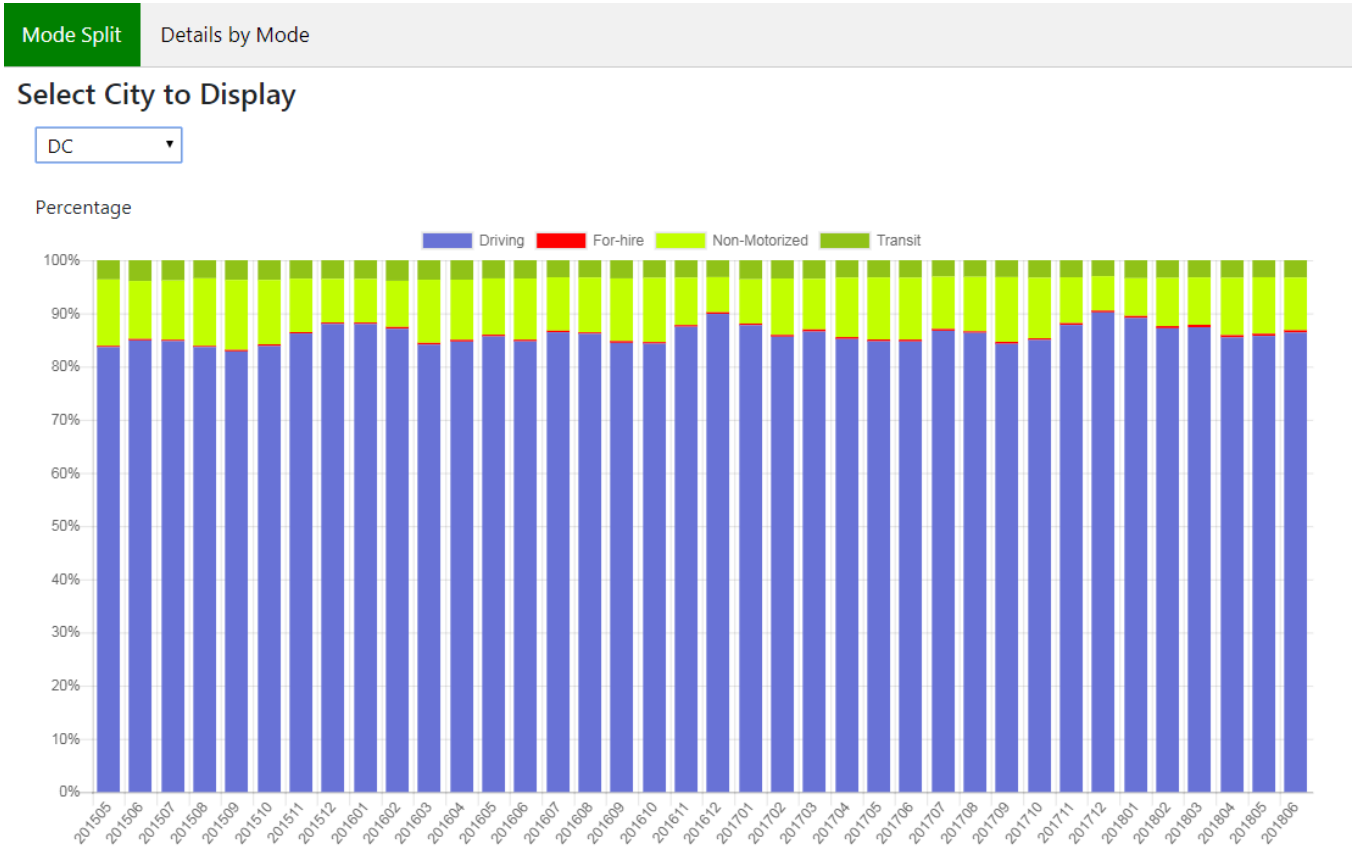
Project Schedule and Status

- Three year project, started at November 2017
- First year of OD products have been successfully produced and delivered to FHWA.
- OD products are being validated and visualized.
- Data imputation and expansion algorithms are being developed and tested. They will be applied to second-year and future OD products.
- Data sandbox is being prepared.

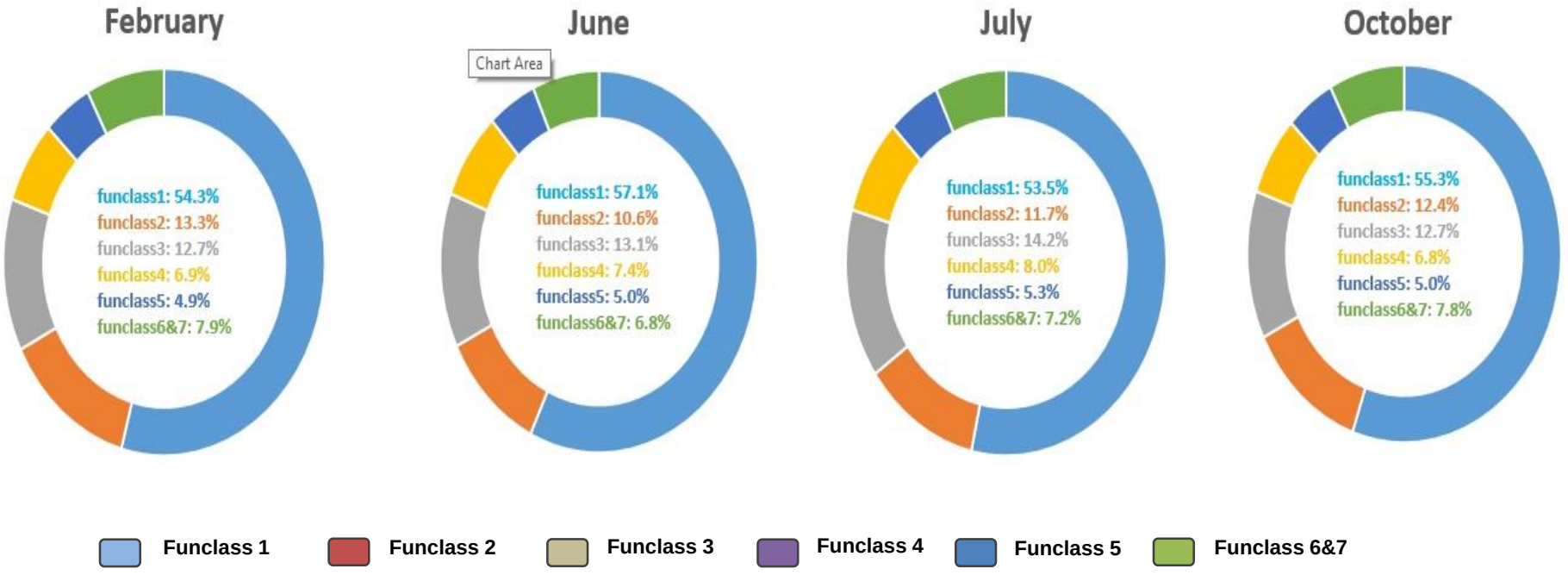
Two Additional Big Data Project at MTI

- Tracking monthly multimodal travel trends at the metropolitan level across the U.S. using public domain big data
- Estimating VMT and local road VMT from GPS vehicle trajectory data
- Both projects were funded by FHWA and have produced products available to state DOTs, MPOs and other users.

Monthly Multimodal Trends Project



VMT ESTIMATION PROJECT



Thank You!

Your Comments and Questions are welcome.

- Project PI

  Lei Zhang

  Herbert Rabin Distinguished Professor

  Director, Maryland Transportation Institute

  301-405-2881, lei@umd.edu

- Project Manager

  Sepehr Ghader

  Research Scientist

  sghader@umd.edu

  Maryland Transportation Institute

WEB-BASED ANALYTICS FOR TRAJECTORY AND OD DATA

Dr. Mark Franz
CATT Lab

O-D & Vehicle Trajectories Data Analytics

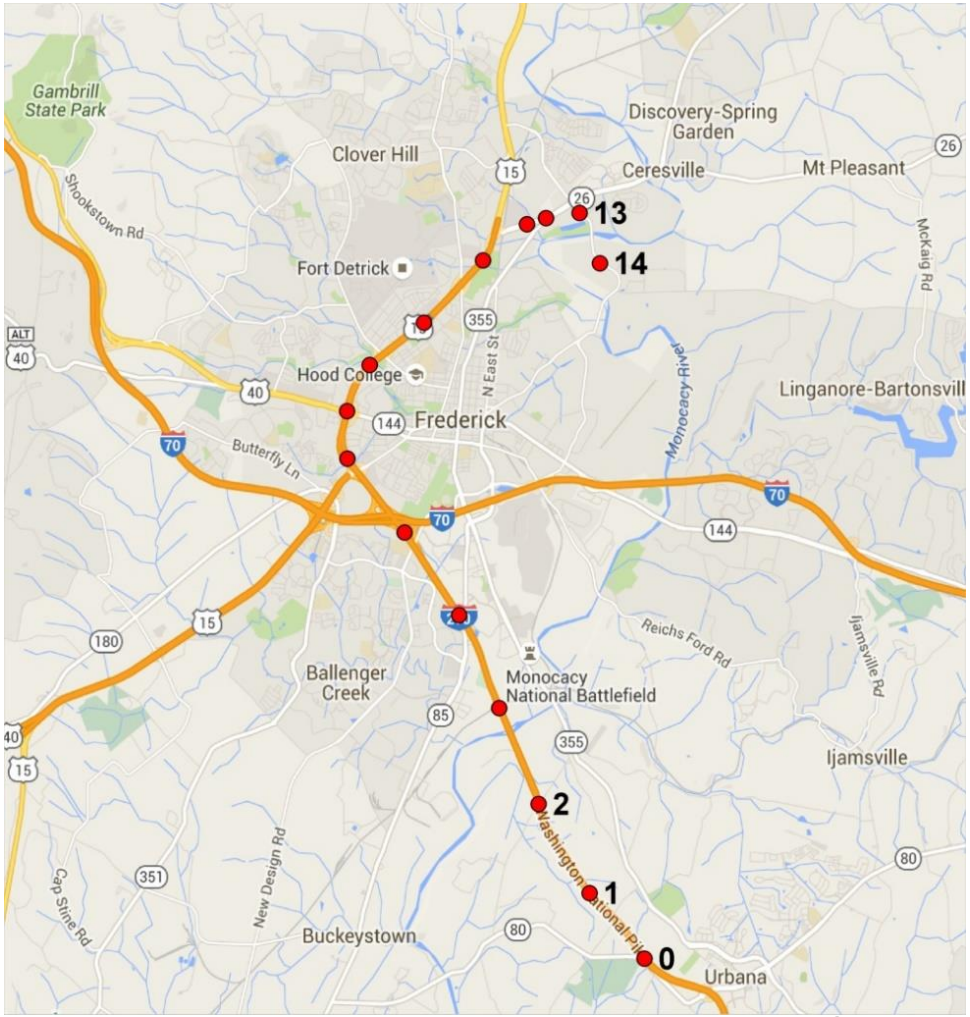
Dr. Mark Franz
CATT Laboratory

Enabling agencies through better communication data-based decision making, advanced insights discovery, and enhanced operations and planning capabilities.

Background

What is trajectory data?

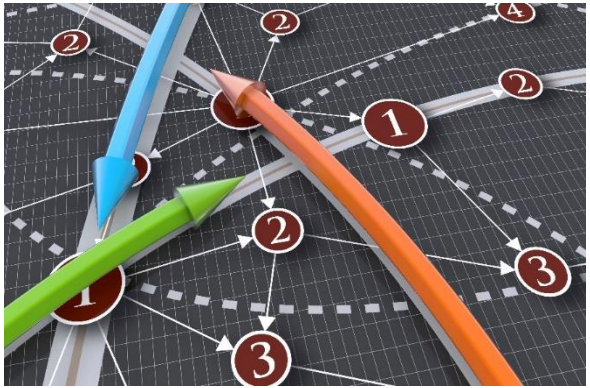
- Time stamped location data from GPS devices
- Data is collected on individual trips
- Trip = sequence of time stamped waypoints (lat/long)
  - Departure time and location (trip origin)
  - Route selection and travel time
  - Arrival time and location (trip destination)



Applications

Trajectory data allows us to understand traveler behavior patterns

- Origin-Destination Patterns
- Mode and Route Selection
- Trip Travel Time
- Before & After Studies (how did travel patterns change during and/or after a project)
- Multi-modal system utilization



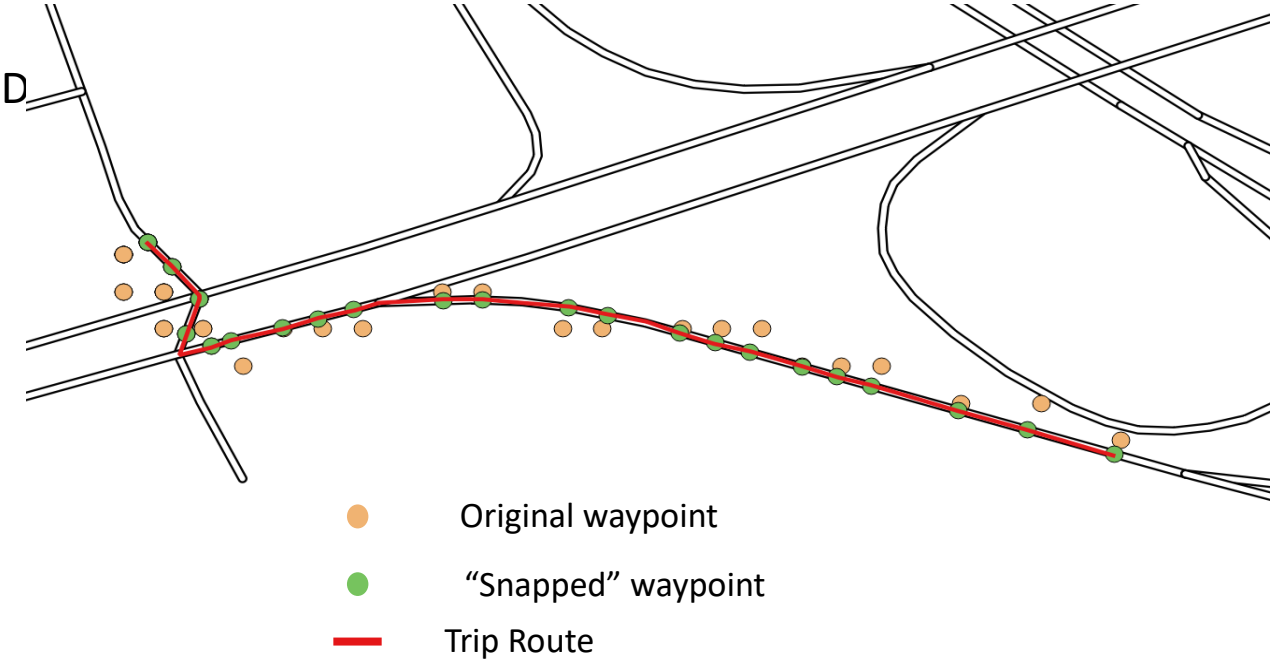
Such info can be used to

- Understand Work Zone Impacts
- Assess detour plans & communications strategies
- Study evacuations
- Asses network performance
- Drive policy changes
- Inform decisions on transportation system investment

One day in D.C.

Challenges

- Big data
  - 4 Months of Data for MD
    - 20 Million trips
    - 1.4 Billion waypoints
    - 112 GB of data
- Data cleaning
  - Snapping
  - Routing



Developing a “traditional” OD Matrix

INRIX Trajectory Analytics

Welcome to the OD Data Suite

Please choose one of the available data sets to explore:

DATA SETS	DATA PROVIDER	DATE RANGE	DETAILS
Maryland Data Set	INRIX	February, June, July, October 2015	Temporal Data Granularity: 1 Second Spatial Data Granularity: Latitude/Longitude Vehicle Types Included: Cars and Trucks (separated or aggregated) Waypoints Included: Yes More information...
Washington DC Metropolitan Statistical Area Data Set	INRIX	February, June, July, October 2015	Temporal Data Granularity: 1 Second Spatial Data Granularity: Latitude/Longitude Vehicle Types Included: Cars and Trucks (separated or aggregated) Waypoints Included: Yes More information...
Washington DC Data Set	INRIX	January, February, March, April, May, June, July, August, September, October, November, December 2015	Temporal Data Granularity: 1 Second Spatial Data Granularity: Latitude/Longitude Vehicle Types Included: Cars and Trucks (separated or aggregated) Waypoints Included: Yes More information...

Top X movements

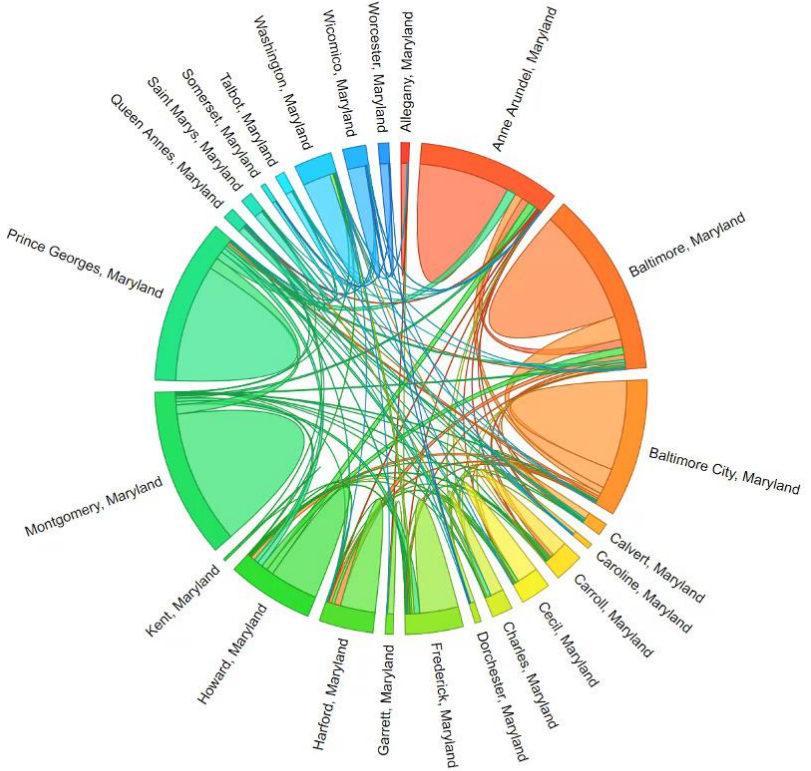
INRIX Trajectory Analytics

Switch to Matrix

Top Ten OD Pairs

Montgomery, Maryland → Montgomery, Maryland	11.83%
Prince Georges, Maryland → Prince Georges, Maryland	10.38%
Baltimore, Maryland → Baltimore, Maryland	10.27%
Anne Arundel, Maryland → Anne Arundel, Maryland	7.99%
Baltimore City, Maryland → Baltimore City, Maryland	7.88%
Howard, Maryland → Howard, Maryland	4.28%
Frederick, Maryland → Frederick, Maryland	3.38%
Harford, Maryland → Harford, Maryland	3.09%
Washington, Maryland → Washington, Maryland	2.45%
Baltimore, Maryland → Baltimore City, Maryland	2.06%

Chord Diagram



Developing a “custom” OD Matrix

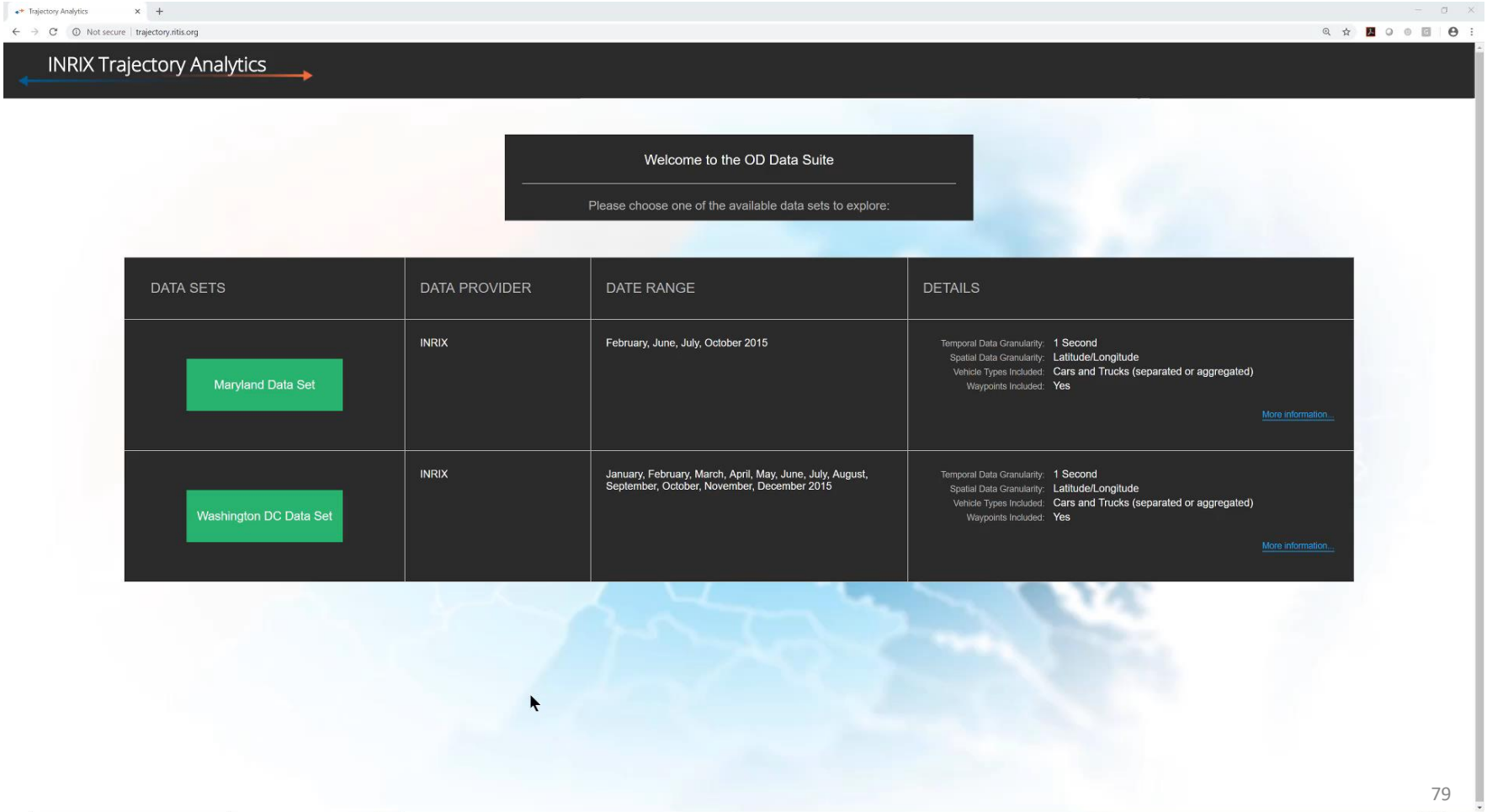
INRIX Trajectory Analytics

Welcome to the OD Data Suite

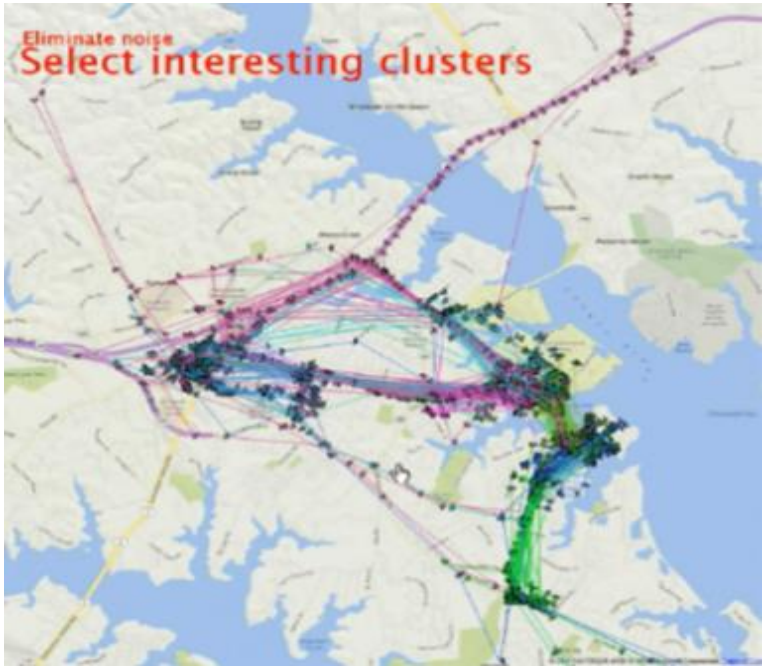
Please choose one of the available data sets to explore:

DATA SETS	DATA PROVIDER	DATE RANGE	DETAILS
Maryland Data Set	INRIX	February, June, July, October 2015	Temporal Data Granularity: 1 Second Spatial Data Granularity: Latitude/Longitude Vehicle Types Included: Cars and Trucks (separated or aggregated) Waypoints Included: Yes More information...
Washington DC Metropolitan Statistical Area Data Set	INRIX	February, June, July, October 2015	Temporal Data Granularity: 1 Second Spatial Data Granularity: Latitude/Longitude Vehicle Types Included: Cars and Trucks (separated or aggregated) Waypoints Included: Yes More information...
Washington DC Data Set	INRIX	January, February, March, April, May, June, July, August, September, October, November, December 2015	Temporal Data Granularity: 1 Second Spatial Data Granularity: Latitude/Longitude Vehicle Types Included: Cars and Trucks (separated or aggregated) Waypoints Included: Yes More information...

Developing a “pass through” trip map visualization



Analyzing specific routes taken



INRIX Trajectory Analytics

My Account | About | Log Out

Route Analysis Tool

Currently Using MD Data Set | Switch Data Set

Origin | Destination | Trip Filters | Time Range

Primary geography

- Maryland
  - Counties
  - Sub-Counties
  - TAZs

Other geography

- Delaware
- D.C
- New Jersey
- Pennsylvania
- Virginia
- West Virginia

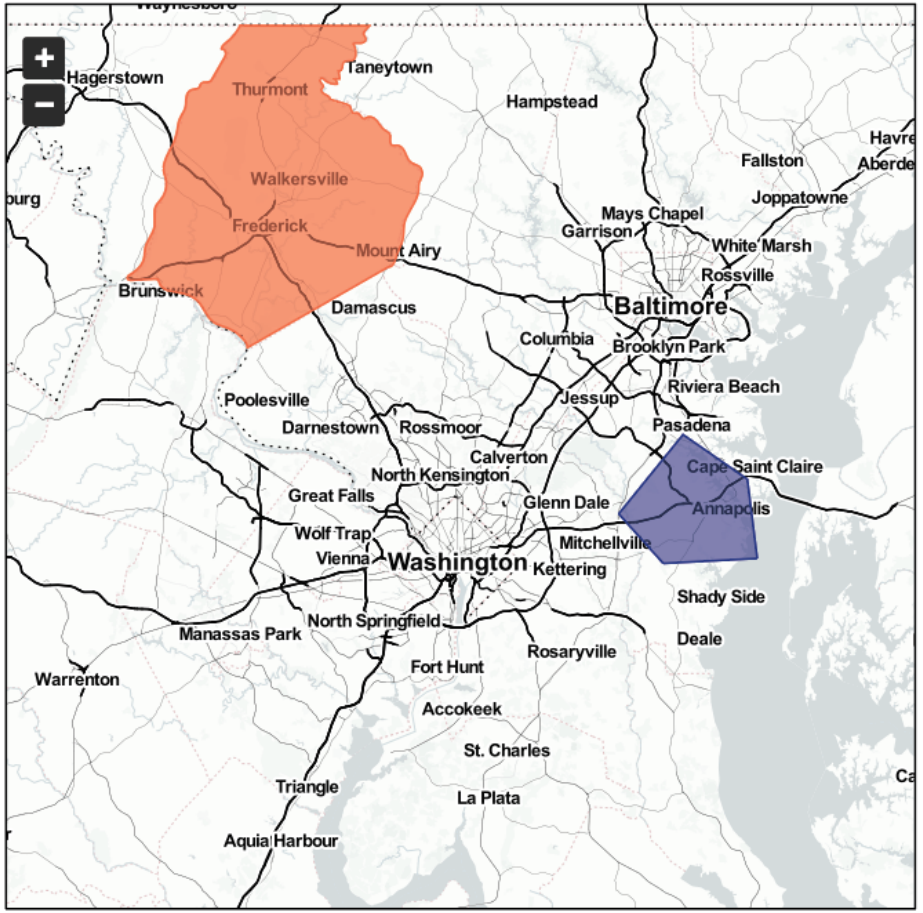
Custom geography

- Custom Geography
  - Geography 1

Add Shape File

Add Custom Geography

Submit



INRIX Trajectory Analytics

My Account | About | Log Out

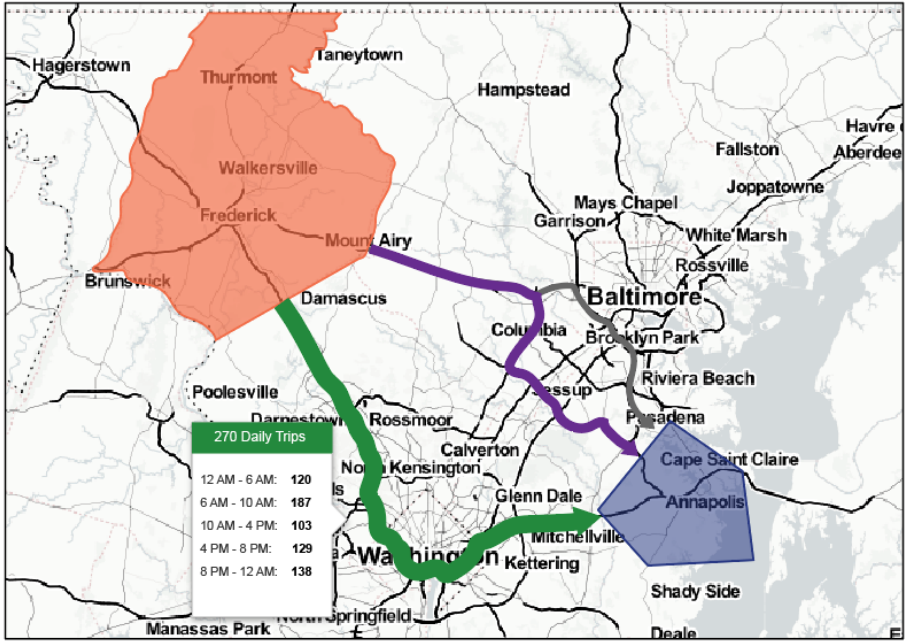
Route Analysis Tool

Switch Origin and Destination | Back to Query

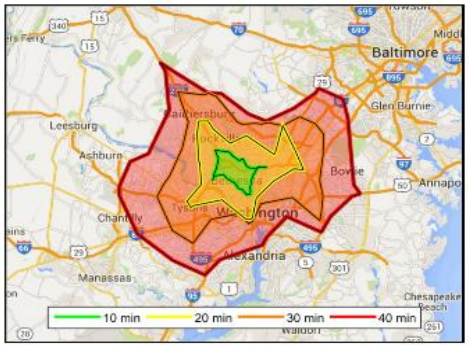
Trips from Frederick County to Custom Geography

Route Analysis Threshold | Time Range: February, June, July... All Da... 12 AM - 12 AM | Trip Filters

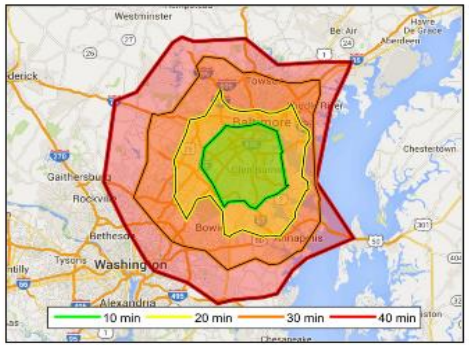
Route	Map View	Percent of Trips	Number of Daily Trips	Avg Travel Time	Min Travel Time	Max Travel Time
270	☑	67%	677	1h 32 min	1h 06 min	2h 05 min
70	☑	29%	291	1h 45 min	1h 18 min	2h 13 min
Others	☑	3%	32	--	--	--



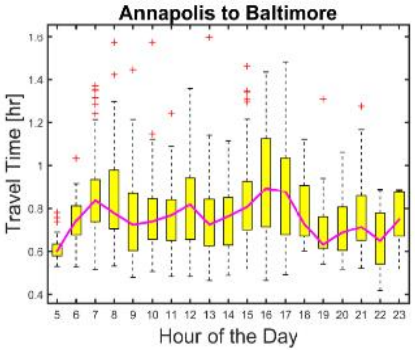
Analyzing ***actual*** observed travel times from points of interest

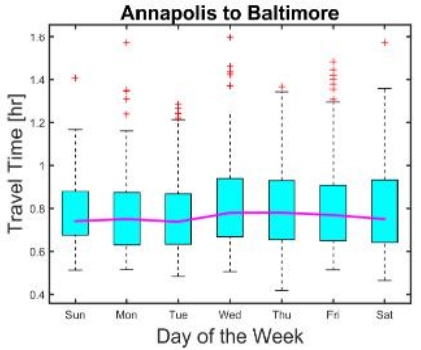


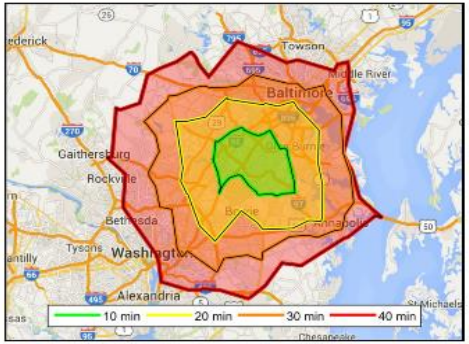
Walter Reed Medical Center



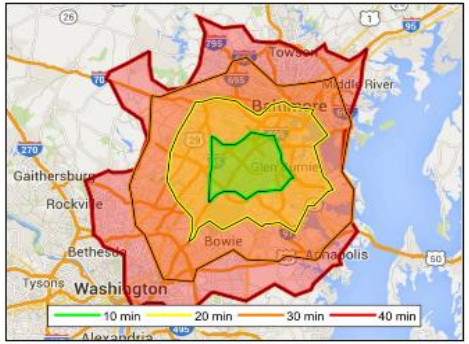
BWI



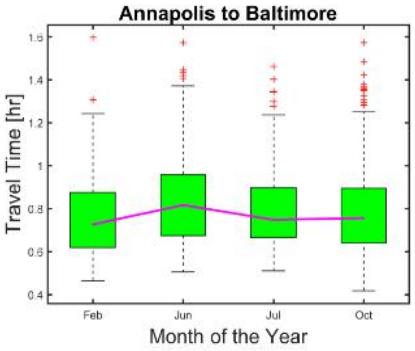


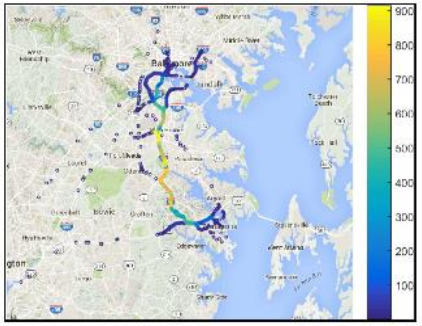


Fort Meade

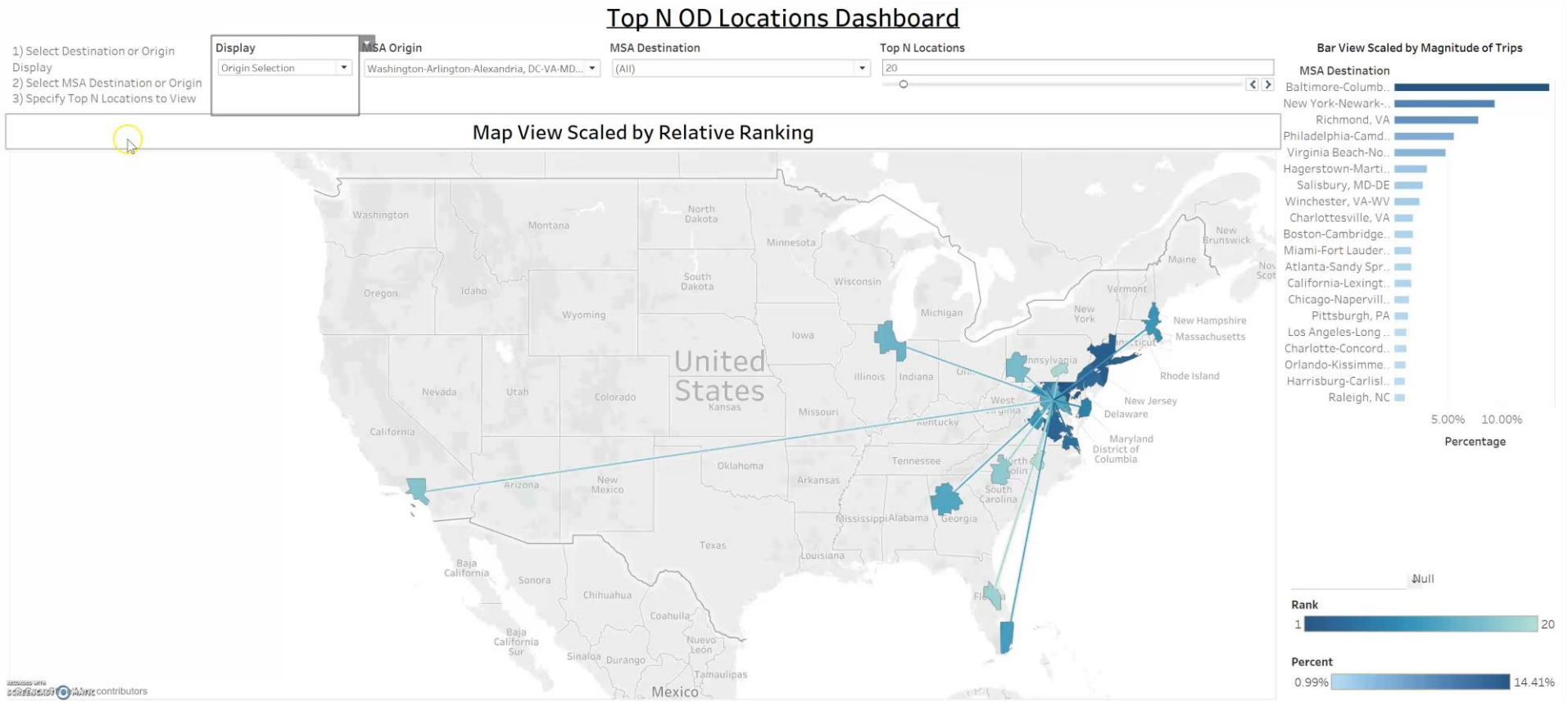


Arundel Mills





Nation-wide movement analytics



Integrating agency Activity Based Model outputs, too.

BMC Planning Model Suite

Trips that travelled on the selected road segments

Map Controls | Tour Filters | Time Range

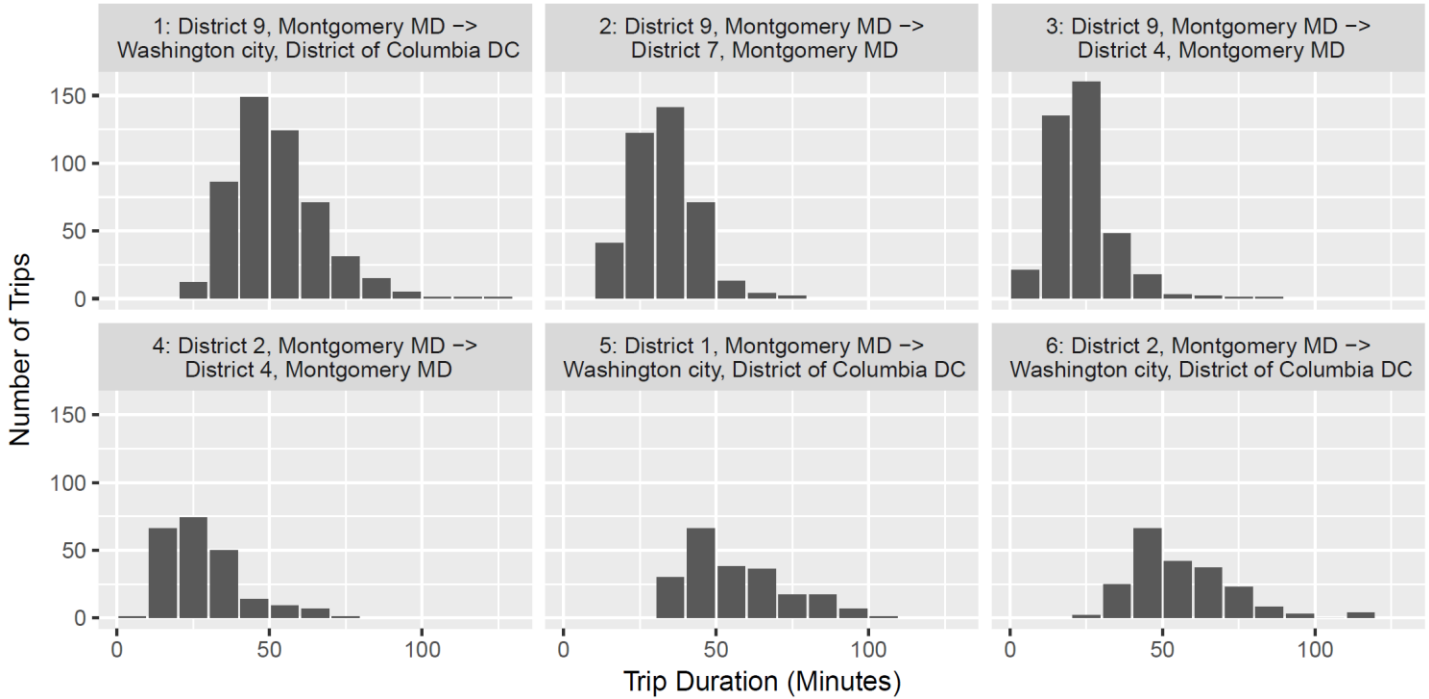
Vehicle occupancy
- SOV
- HOV

Tour purpose
- Mandatory
- Non-mandatory

Value of time
- $0.00 - $10.23/hr
- $10.23 - $21.99/hr
- $21.99 - $40.89/hr
- $40.89 - $78.55/hr
- $78.55+/hr

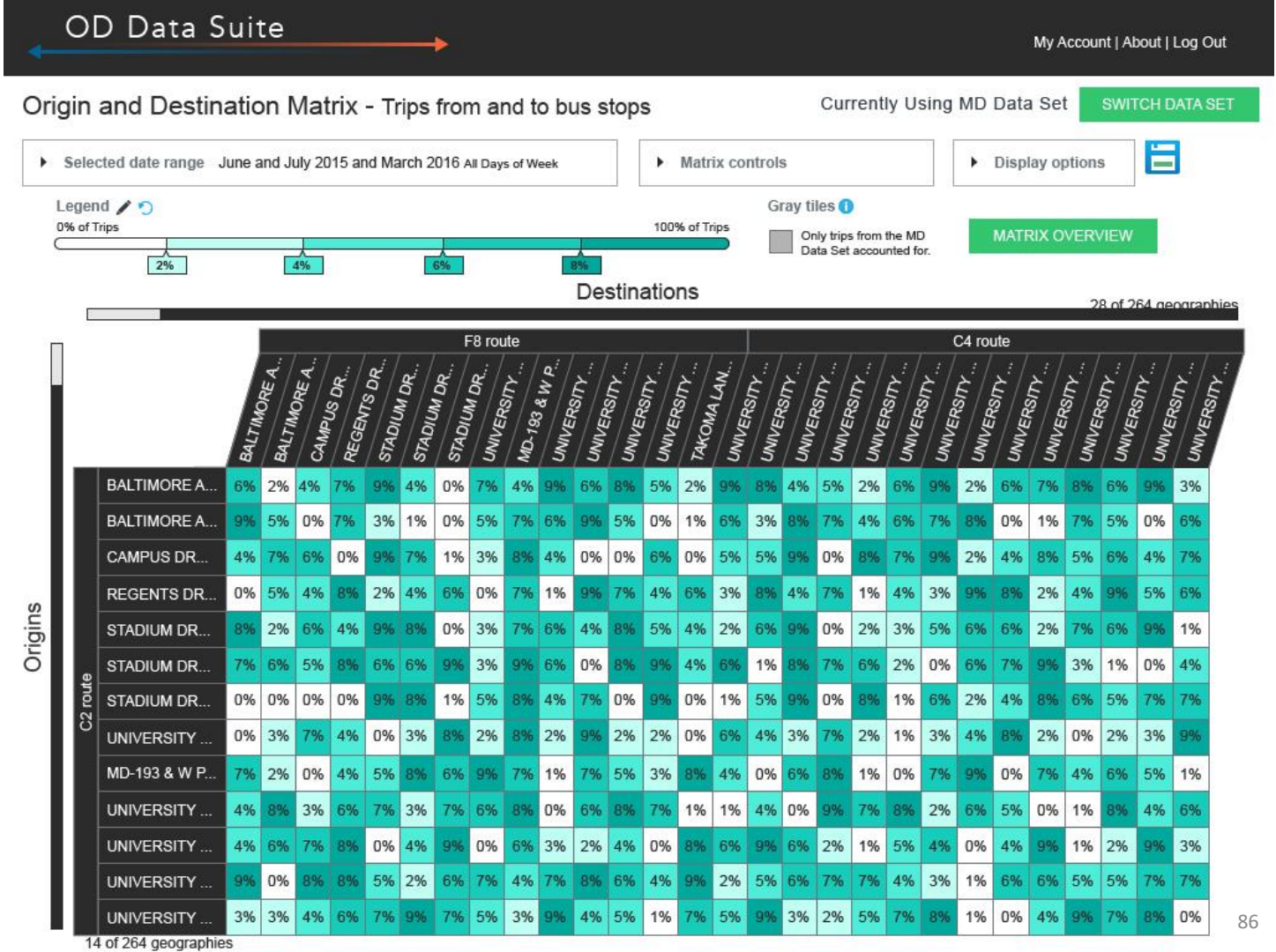
Household income
- <$15k/yr
- $15k-$30k/yr
- $30k-$50k/yr
- $50k-$100k/yr
- >$100k/yr

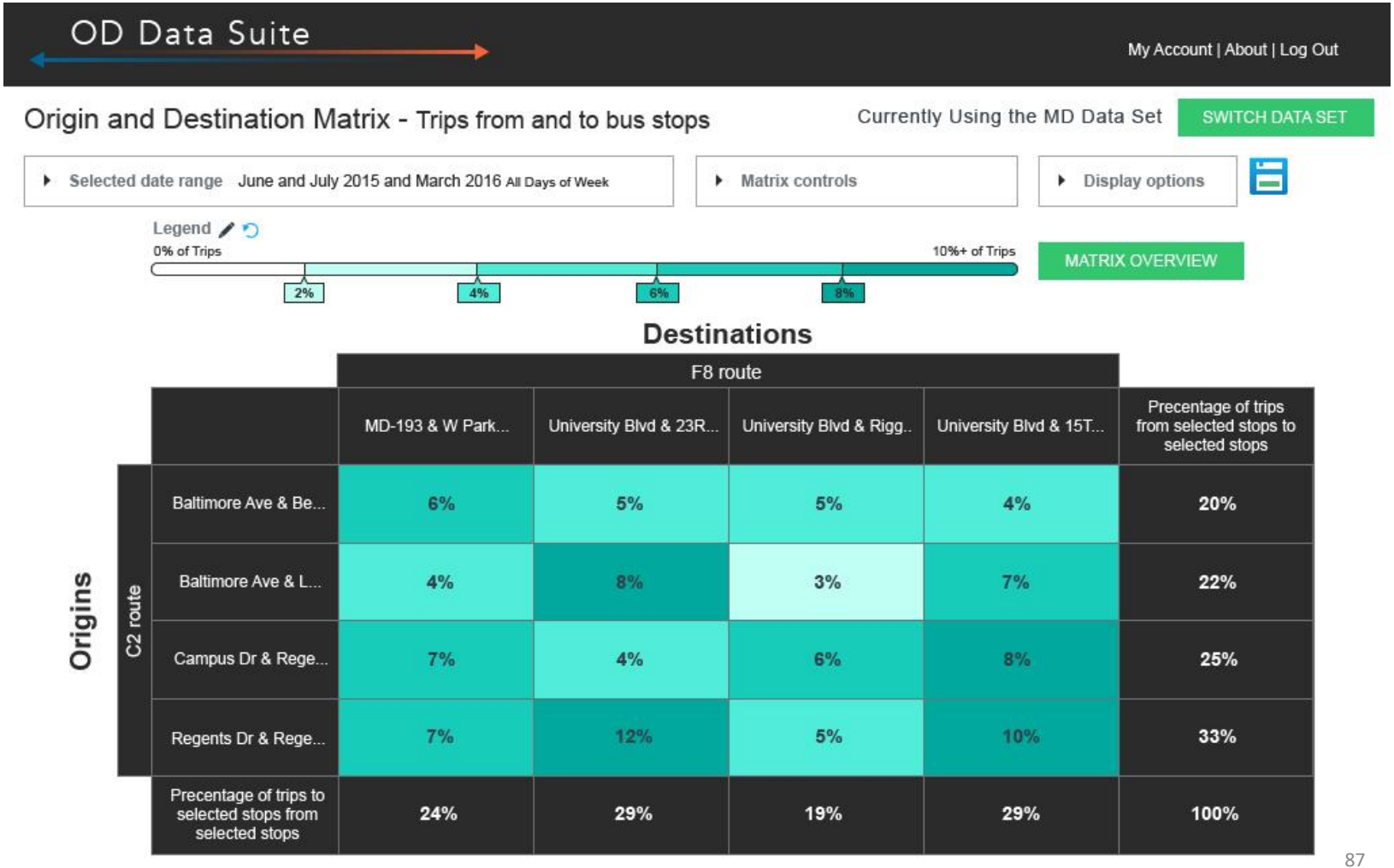
View Matrix | Submit



Transit!

- With good passenger counts and swipe-on/ swipe-off data, a user can generate any trip matrix in just a few minutes.




OD Data Suite
My Account | About | Log Out
Origin and Destination Matrix - Trips from and to bus stops
Currently Using the MD Data Set
SWITCH DATA SET
Selected date range June and July 2015 and March 2016 All Days of Week
Matrix controls
Display options
Legend
0% of Trips
10%+ of Trips
2%
4%
6%
8%
MATRIX OVERVIEW
Destinations
F8 route
MD-193 & W Park...
University Blvd & 23R...
University Blvd & Rigg..
University Blvd & 15T...
Precentage of trips from selected stops to selected stops
Origins
C2 route
Baltimore Ave & Be... 6% 5% 5% 4% 20%
Baltimore Ave & L... 4% 8% 3% 7% 22%
Campus Dr & Rege... 7% 4% 6% 8% 25%
Regents Dr & Rege... 7% 12% 5% 10% 33%
Precentage of trips to selected stops from selected stops
24% 29% 19% 29% 100%

Dr. Mark Franz, Lead Transportation Analyst
MFranz1@umd.edu

SIGNAL TIMING ANALYSIS USING TRAJECTORY DATA ANALYTICS

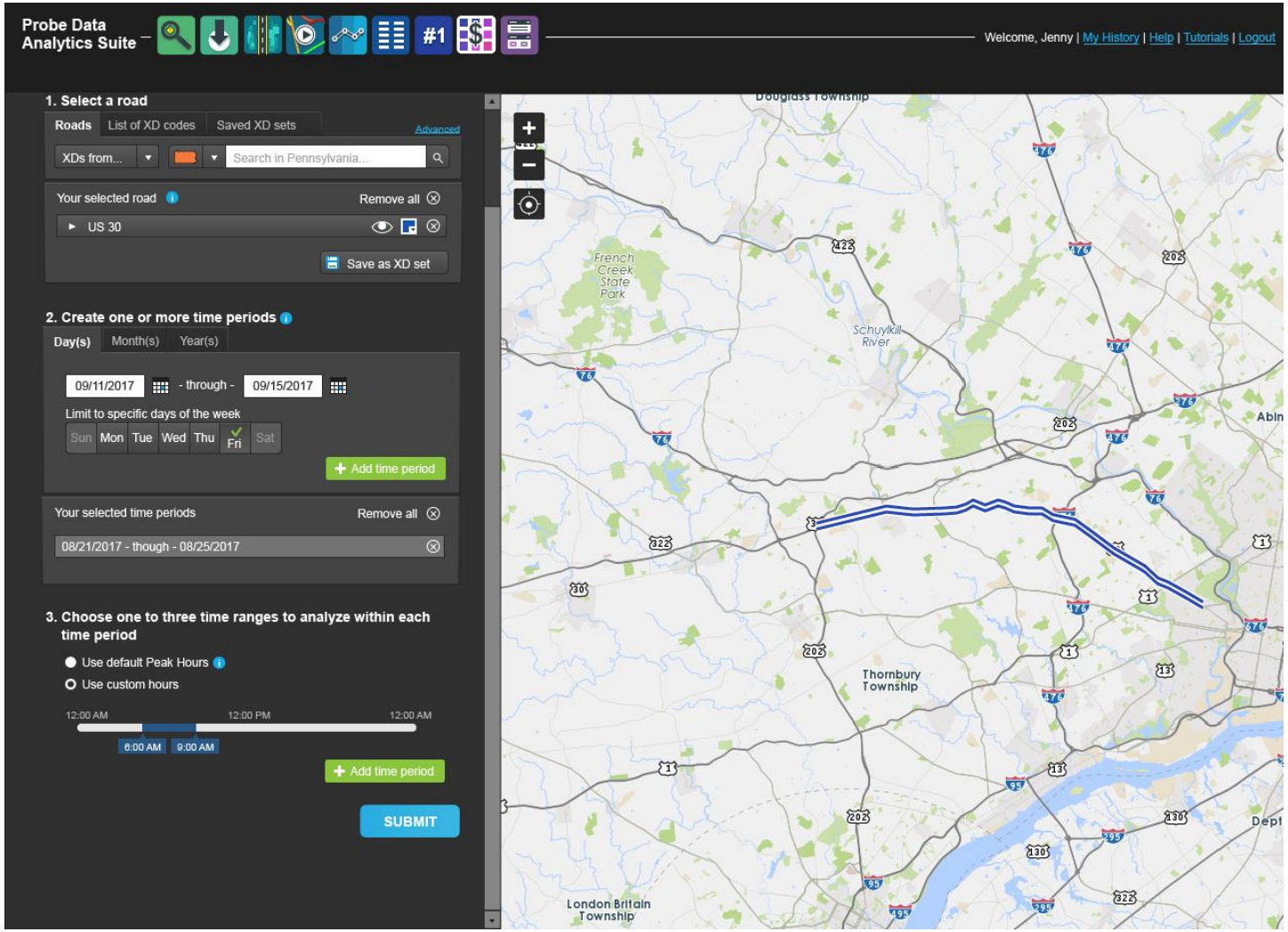
Michael Pack
CATT Lab

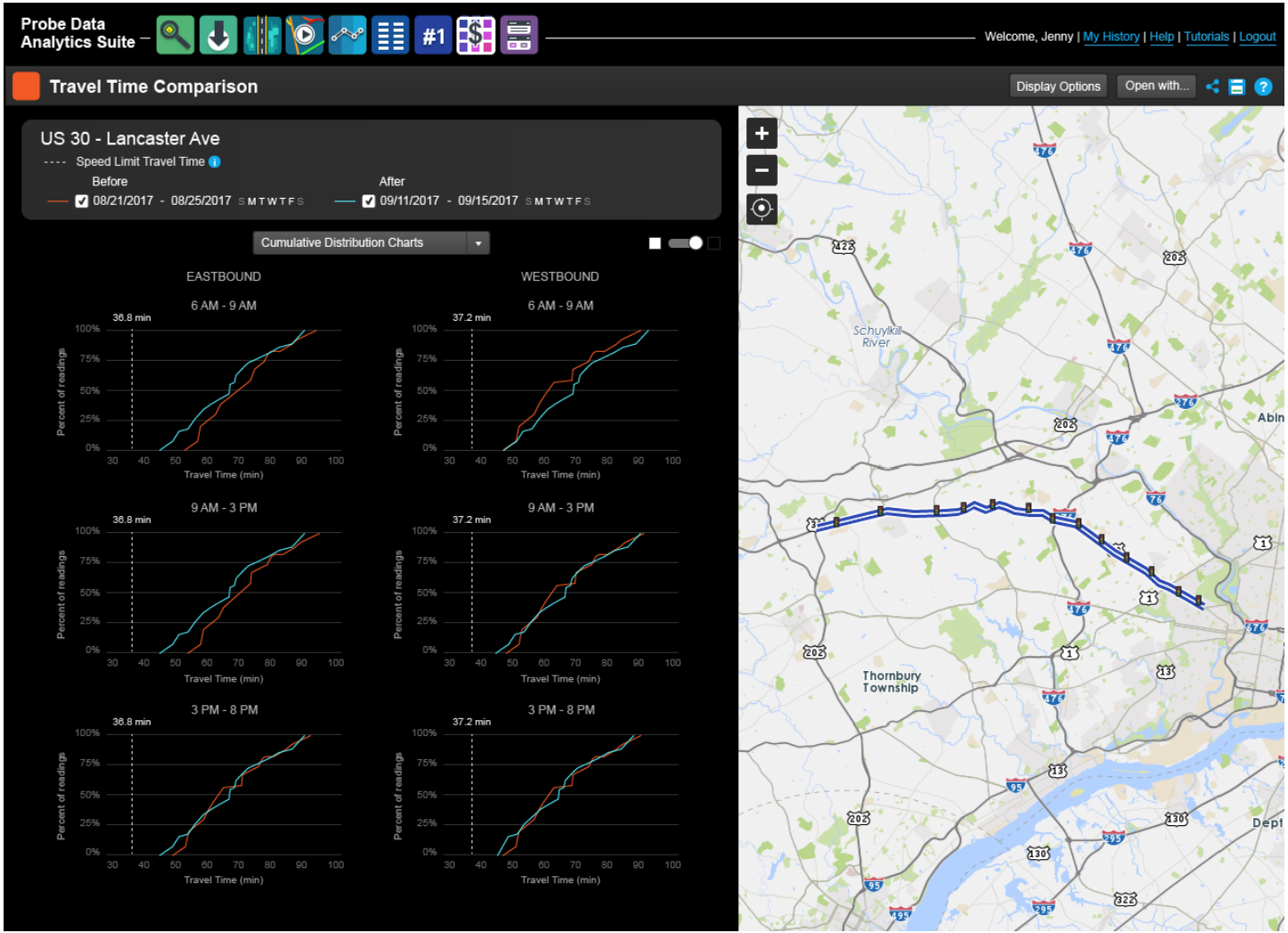
Signal Timing Analysis

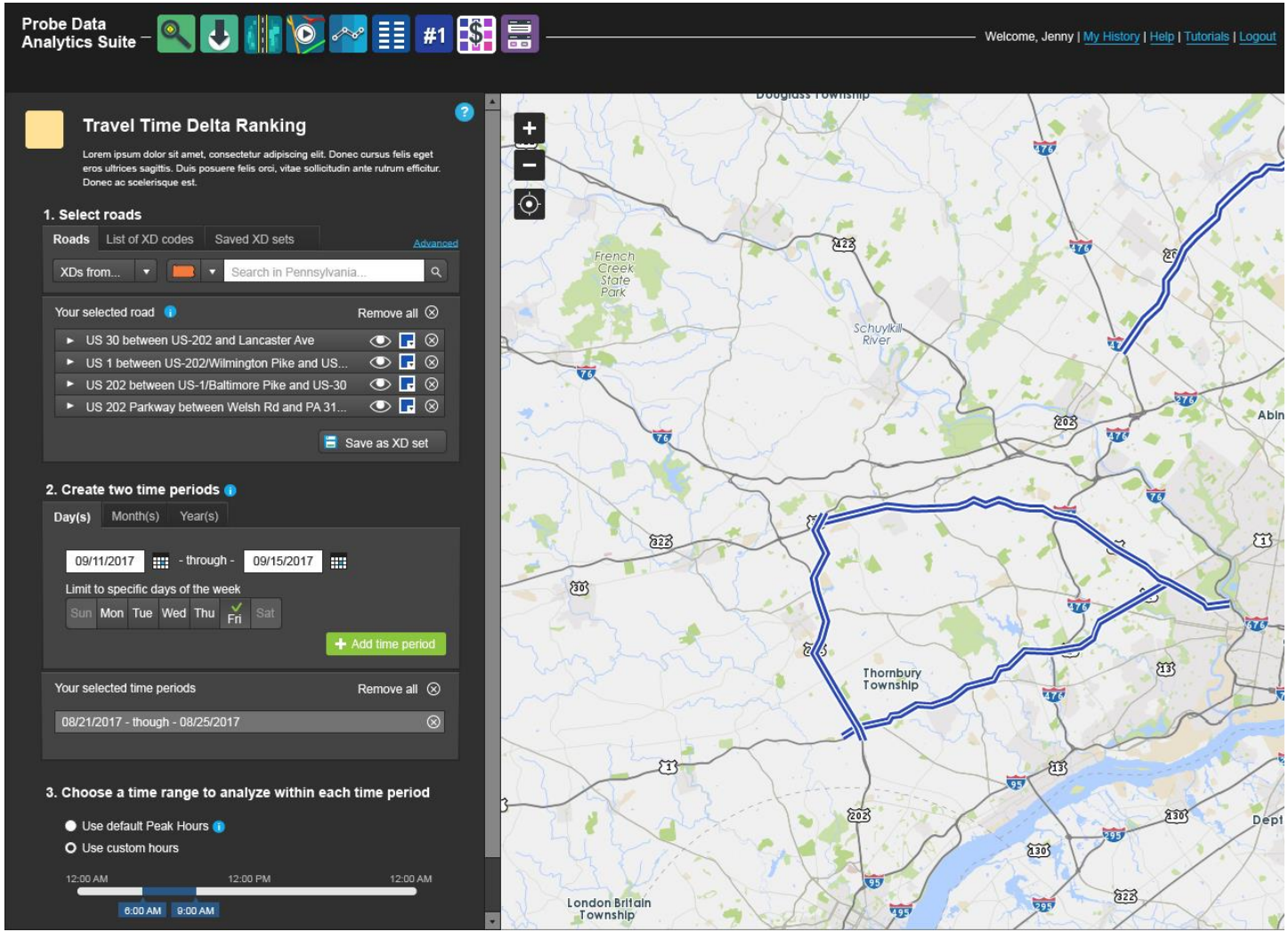
(using trajectory data analytics)

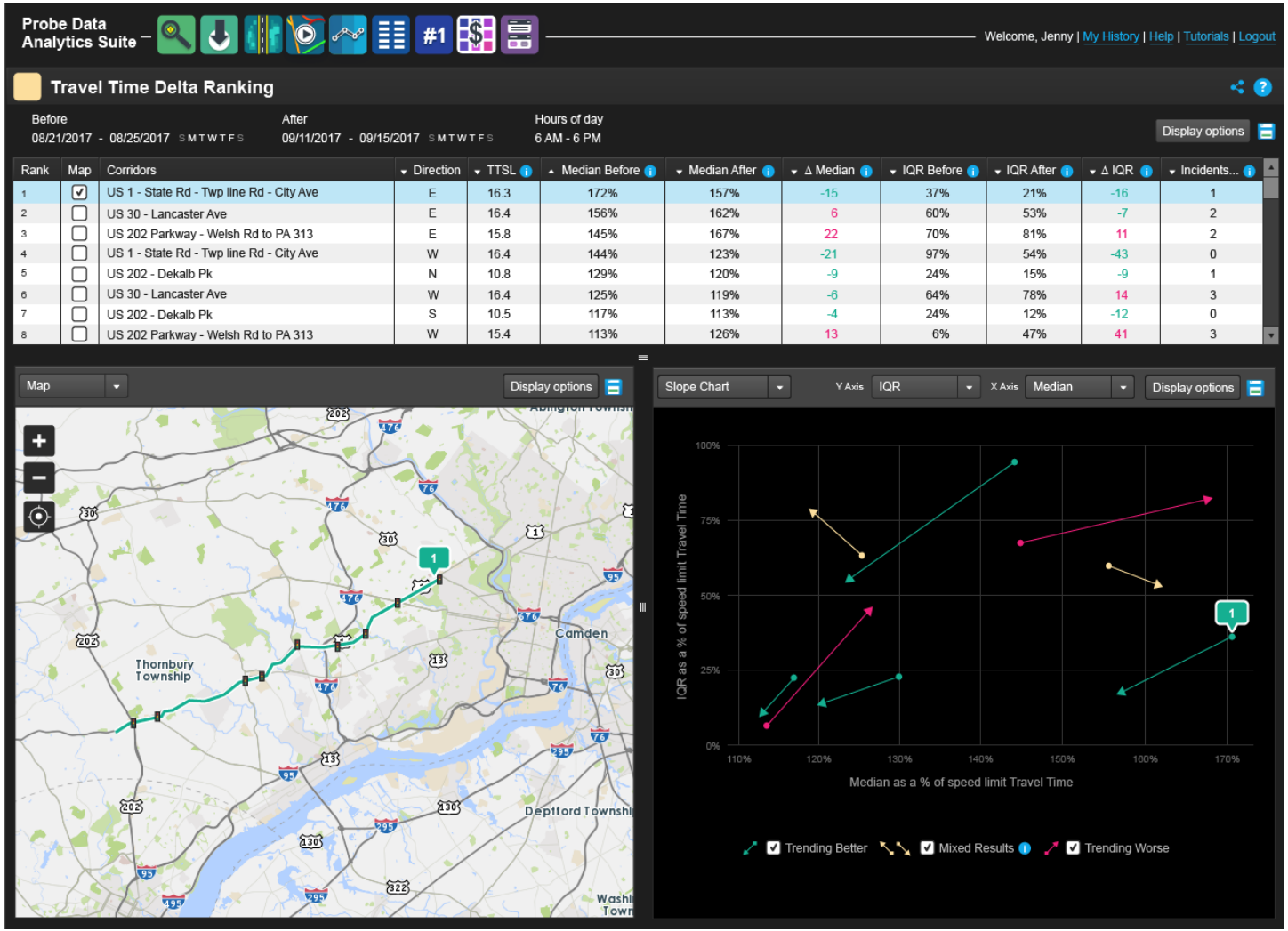
Michael Pack, Director of CATT Laboratory

Enabling agencies through better communication data-based decision making, advanced insights discovery, and enhanced operations and planning capabilities.


Probe Data Analytics Suite
Welcome, Jenny | My History | Help | Tutorials | Logout
1. Select a road
Roads
List of XD codes
Saved XD sets
Advanced
XDs from...
Search in Pennsylvania...
Your selected road
Remove all
US 30
Save as XD set
2. Create one or more time periods
Day(s)
Month(s)
Year(s)
09/11/2017
- through -
09/15/2017
Limit to specific days of the week
Sun
Mon
Tue
Wed
Thu
Fri
Sat
Add time period
Your selected time periods
Remove all
08/21/2017 - though - 08/25/2017
3. Choose one to three time ranges to analyze within each time period
Use default Peak Hours
Use custom hours
12:00 AM
12:00 PM
12:00 AM
6:00 AM
9:00 AM
Add time period
SUBMIT
Douglass Township
French Creek State Park
Schuylkill River
Thornbury Township
London Britain Township


Probe Data Analytics Suite
Welcome, Jenny | My History | Help | Tutorials | Logout
Travel Time Comparison
Display Options
Open with...
US 30 - Lancaster Ave
Speed Limit Travel Time
Before
08/21/2017 - 08/25/2017 S M T W T F S
After
09/11/2017 - 09/15/2017 S M T W T F S
Cumulative Distribution Charts
EASTBOUND
WESTBOUND
6 AM - 9 AM
9 AM - 3 PM
3 PM - 8 PM
36.8 min
37.2 min
Percent of readings
Travel Time (min)
Schuylkill River
Thornbury Township


Probe Data Analytics Suite
Welcome, Jenny | My History | Help | Tutorials | Logout
Travel Time Delta Ranking
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec cursus felis eget eros ultrices sagittis. Duis posuere felis orci, vitae sollicitudin ante rutrum efficitur. Donec ac scelerisque est.
1. Select roads
Roads
List of XD codes
Saved XD sets
Advanced
XDs from...
Search in Pennsylvania...
Your selected road
Remove all
US 30 between US-202 and Lancaster Ave
US 1 between US-202/Wilmington Pike and US...
US 202 between US-1/Baltimore Pike and US-30
US 202 Parkway between Welsh Rd and PA 31...
Save as XD set
2. Create two time periods
Day(s)
Month(s)
Year(s)
09/11/2017
- through -
09/15/2017
Limit to specific days of the week
Sun
Mon
Tue
Wed
Thu
Fri
Sat
Add time period
Your selected time periods
Remove all
08/21/2017 - though - 08/25/2017
3. Choose a time range to analyze within each time period
Use default Peak Hours
Use custom hours
12:00 AM
12:00 PM
12:00 AM
6:00 AM
9:00 AM
French Creek State Park
Schuylkill River
Thornbury Township
London Britain Township

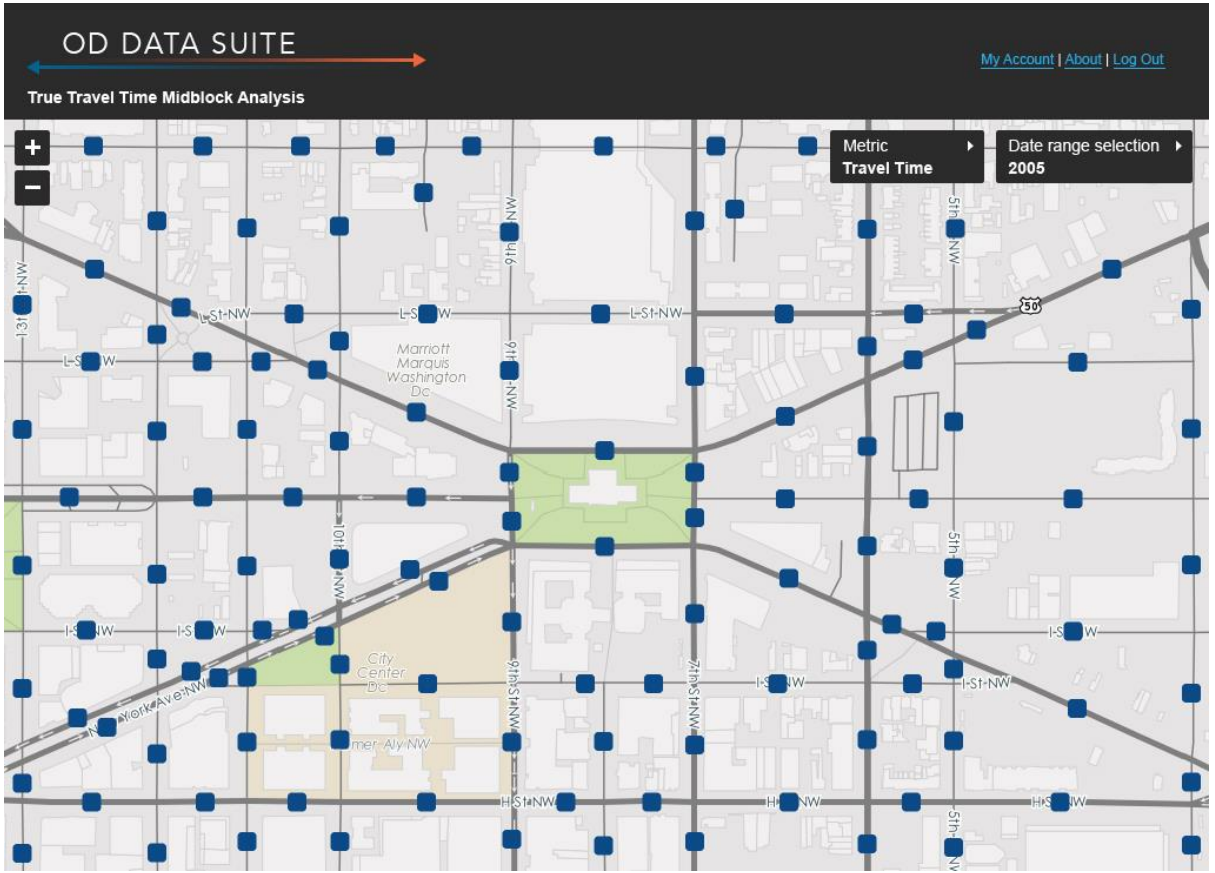

Probe Data Analytics Suite
Welcome, Jenny | My History | Help | Tutorials | Logout
Travel Time Delta Ranking
Before
08/21/2017 - 08/25/2017 S M T W T F S
After
09/11/2017 - 09/15/2017 S M T W T F S
Hours of day
6 AM - 6 PM
Display options
Rank | Map | Corridors | Direction | TTSL | Median Before | Median After | Δ Median | IQR Before | IQR After | Δ IQR | Incidents...
1 | US 1 - State Rd - Twp line Rd - City Ave | E | 16.3 | 172% | 157% | -15 | 37% | 21% | -16 | 1
2 | US 30 - Lancaster Ave | E | 16.4 | 156% | 162% | 6 | 60% | 53% | -7 | 2
3 | US 202 Parkway - Welsh Rd to PA 313 | E | 15.8 | 145% | 167% | 22 | 70% | 81% | 11 | 2
4 | US 1 - State Rd - Twp line Rd - City Ave | W | 16.4 | 144% | 123% | -21 | 97% | 54% | -43 | 0
5 | US 202 - Dekalb Pk | N | 10.8 | 129% | 120% | -9 | 24% | 15% | -9 | 1
6 | US 30 - Lancaster Ave | W | 16.4 | 125% | 119% | -6 | 64% | 78% | 14 | 3
7 | US 202 - Dekalb Pk | S | 10.5 | 117% | 113% | -4 | 24% | 12% | -12 | 0
8 | US 202 Parkway - Welsh Rd to PA 313 | W | 15.4 | 113% | 126% | 13 | 6% | 47% | 41 | 3
Map
Display options
Thornbury Township
Camden
Deptford Township
Slope Chart
Y Axis IQR
X Axis Median
Display options
IQR as a % of speed limit Travel Time
Median as a % of speed limit Travel Time
100%
75%
50%
25%
0%
110%
120%
130%
140%
150%
160%
170%
Trending Better
Mixed Results
Trending Worse

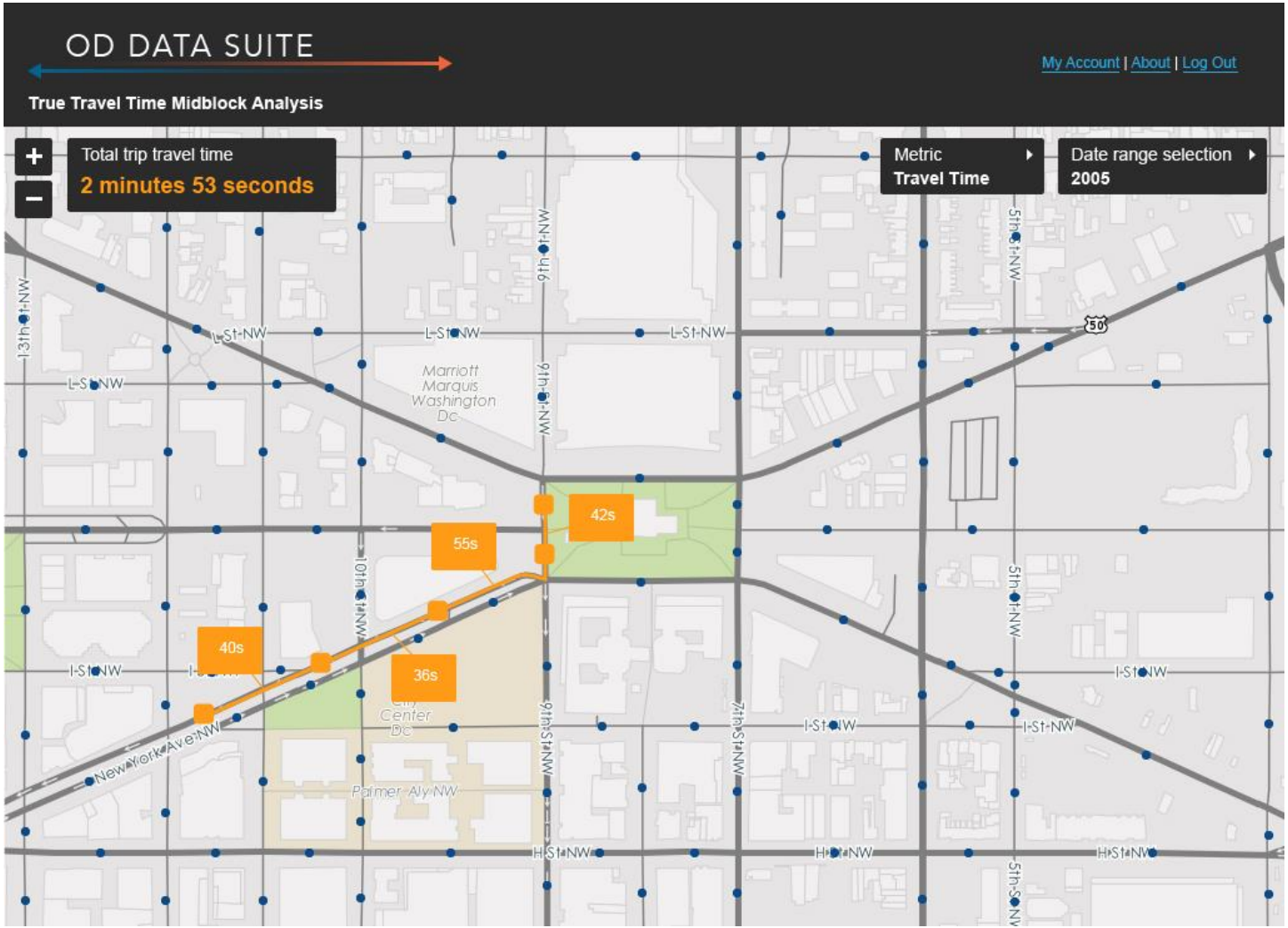
Can we do more with trajectories? YES!

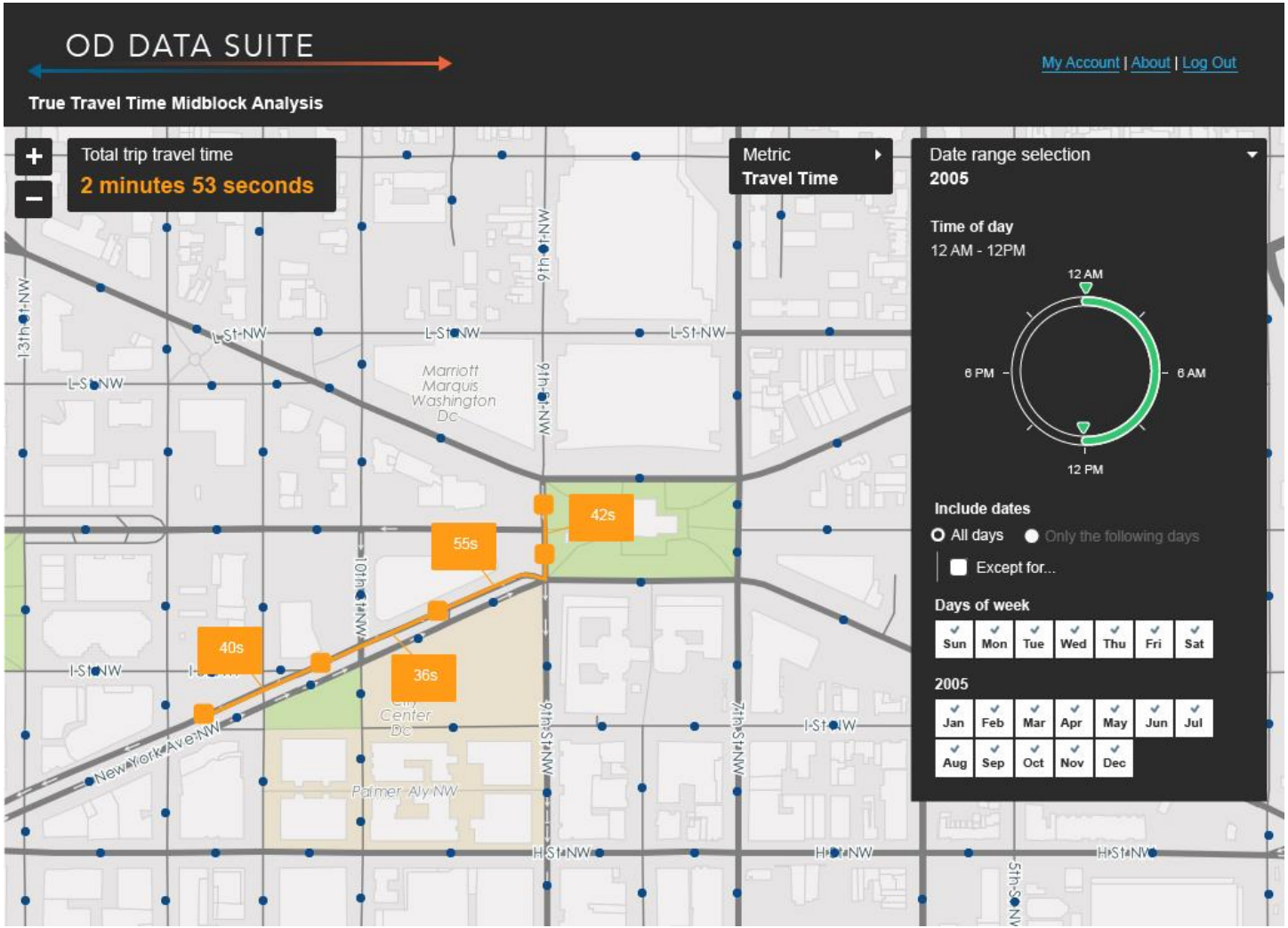
Mid-block travel time analysis…

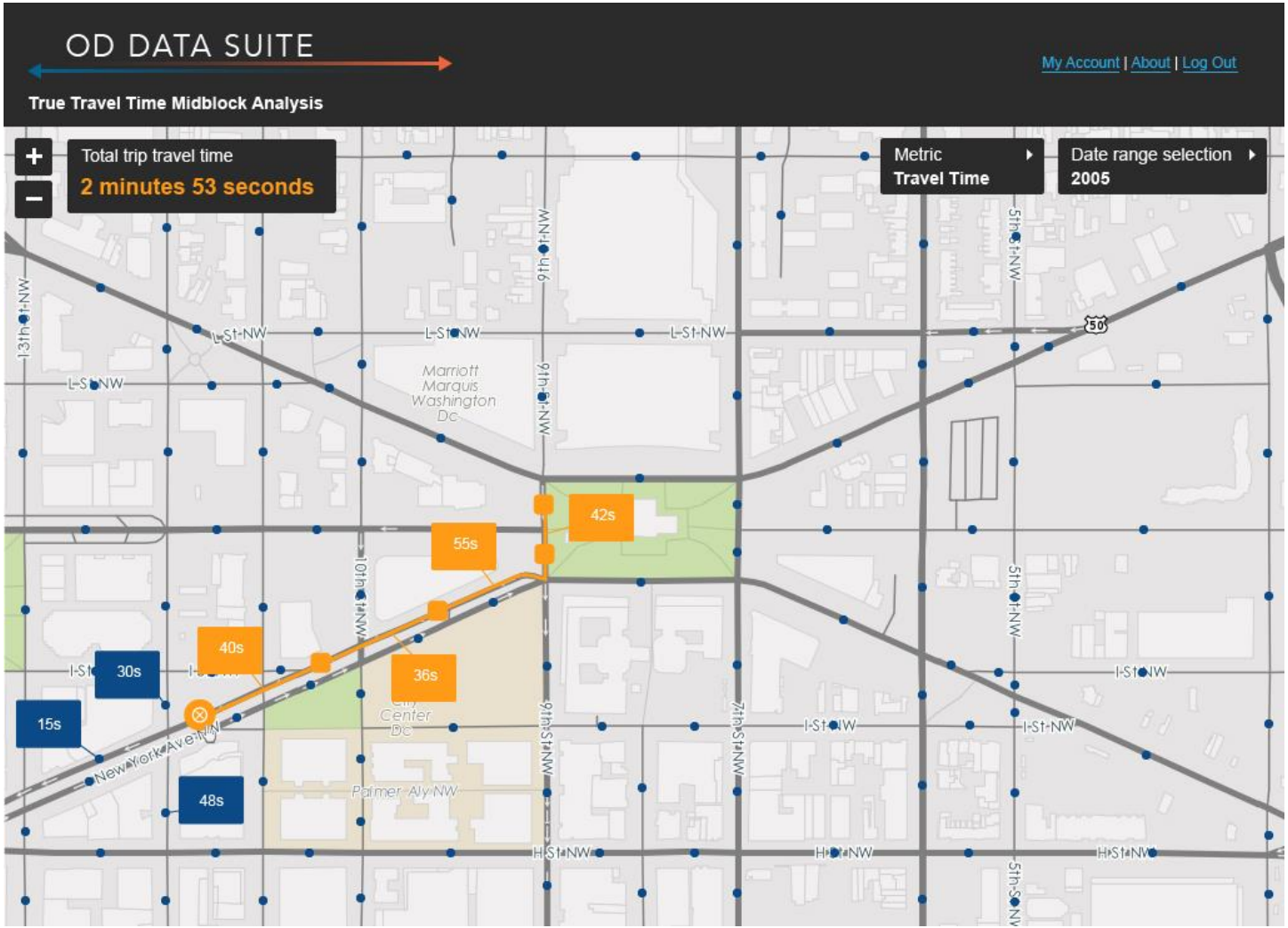
Turning Movement support…

O-D, trips, marketing, etc…




OD DATA SUITE
My Account | About | Log Out
True Travel Time Midblock Analysis
Total trip travel time
2 minutes 53 seconds
Metric
Travel Time
Date range selection
2005
42s
55s
40s
36s
Marriott Marquis Washington Dc
City Center Dc
Palmer Aly NW
L St NW
I St NW
H St NW
New York Ave NW
9th St NW
10th St NW
7th St NW
5th St NW
13th St NW
50


OD DATA SUITE
My Account | About | Log Out
True Travel Time Midblock Analysis
Total trip travel time
2 minutes 53 seconds
Metric
Travel Time
Date range selection
2005
Time of day
12 AM - 12PM
12 AM
6 PM
6 AM
12 PM
Include dates
All days
Only the following days
Except for...
Days of week
Sun
Mon
Tue
Wed
Thu
Fri
Sat
2005
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
42s
55s
40s
36s
L St NW
I St NW
H St NW
New York Ave NW
Marriott Marquis Washington Dc
Palmer Aly NW


OD DATA SUITE
My Account | About | Log Out
True Travel Time Midblock Analysis
Total trip travel time
2 minutes 53 seconds
Metric
Travel Time
Date range selection
2005
42s
55s
40s
36s
30s
15s
48s
Marriott Marquis Washington Dc
Palmer Aly NW
13th St NW
L St NW
9th St NW
10th St NW
5th St NW
7th St NW
I St NW
H St NW
New York Ave NW
50

INTERSECTION ANALYSIS TOOL

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Integer ultrices nibh lacus, eget blandit sapien sagittis sed.

1. Select a region or intersection

- (•) Region
  - Select a state: New York
  - Select a county: New York
  - Select a zip code: Enter zipe code...
- ( ) Intersection

2. Select a date range

05/10/2018 -through- 05/10/2018

Select days of week

Sun Mon Tue Wed Thu Fri Sat

Find Intersection

Region
Zip code: 10011

Date range
05/10/2018 SMTWTFS

Travel Time
1 mins 2 3 4 5 6+ mins

Worst intersections in region

W 20th st and 8th ave
Average Travel Time through intersection
5.4 mins

W 19th st and 9th ave
Average Travel Time through intersection
5.2 mins

W 20th st and 6th ave
Average Travel Time through intersection
5.0 mins

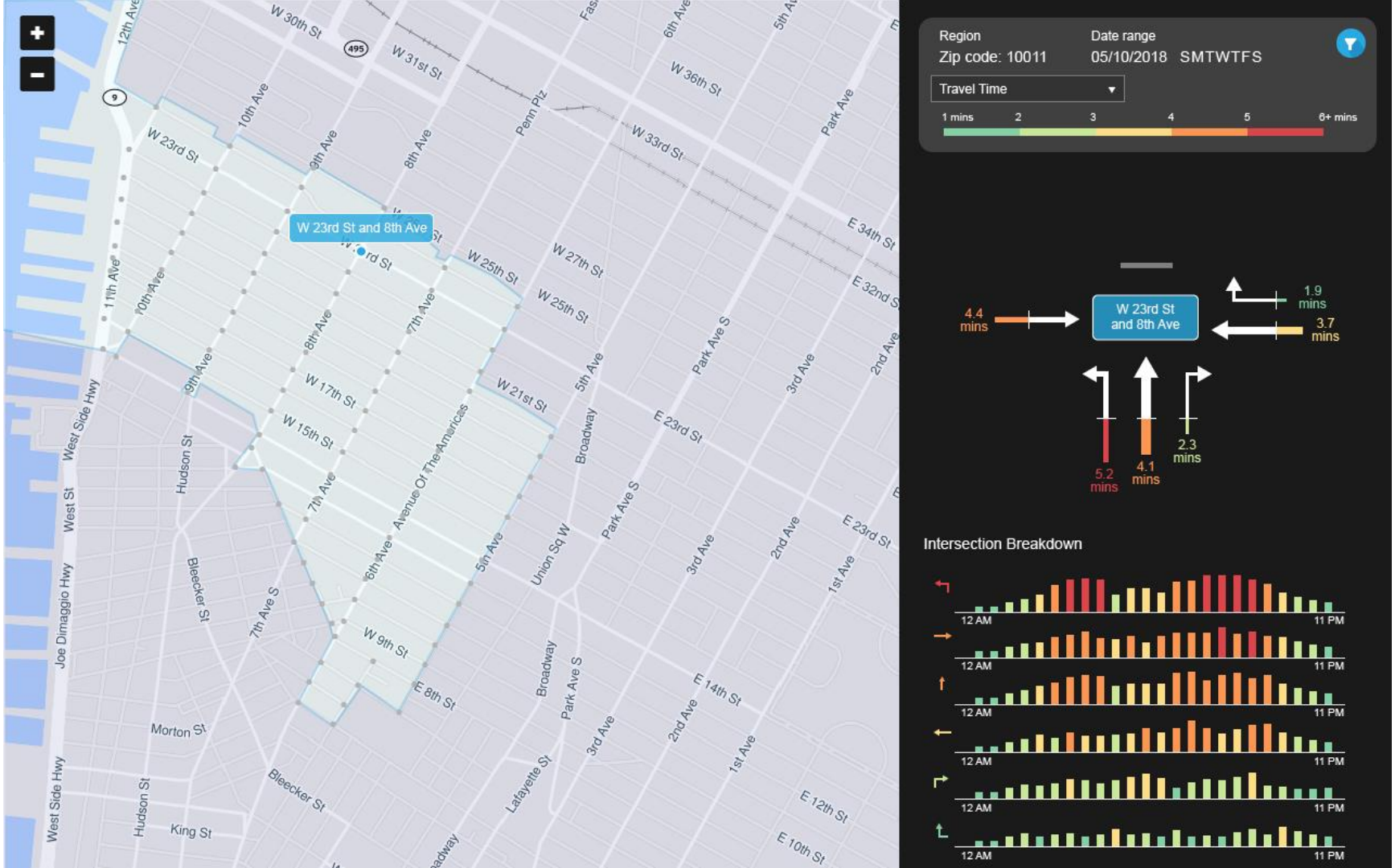
W 17th st and 7th ave
Average Travel Time through intersection
4.9 mins

W 23th st and 8th ave
Average Travel Time through intersection
4.5 mins

W 22th st and 8th ave
Average Travel Time through intersection
4.5 mins

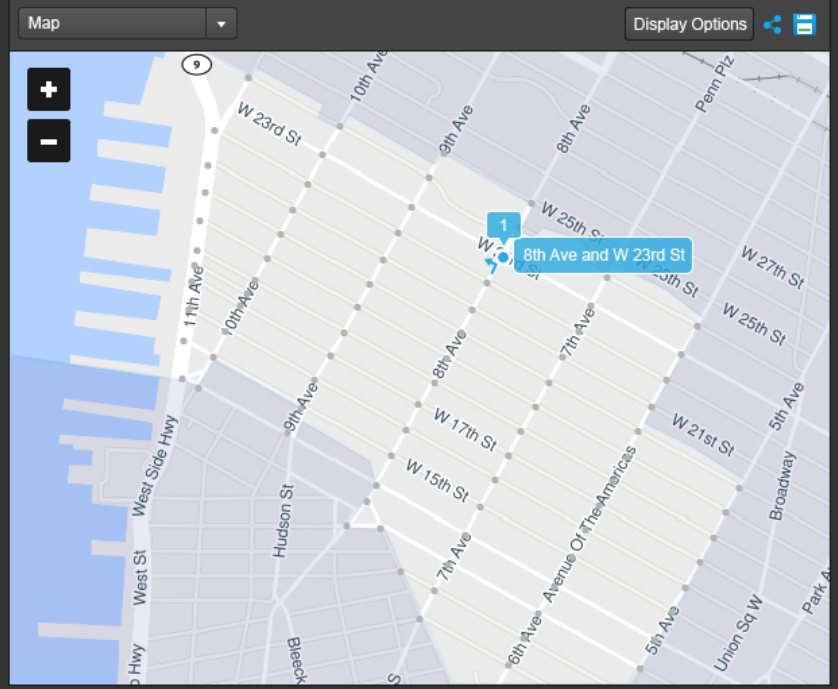
W 20th st and 7th ave
Average Travel Time through intersection
4.2 mins

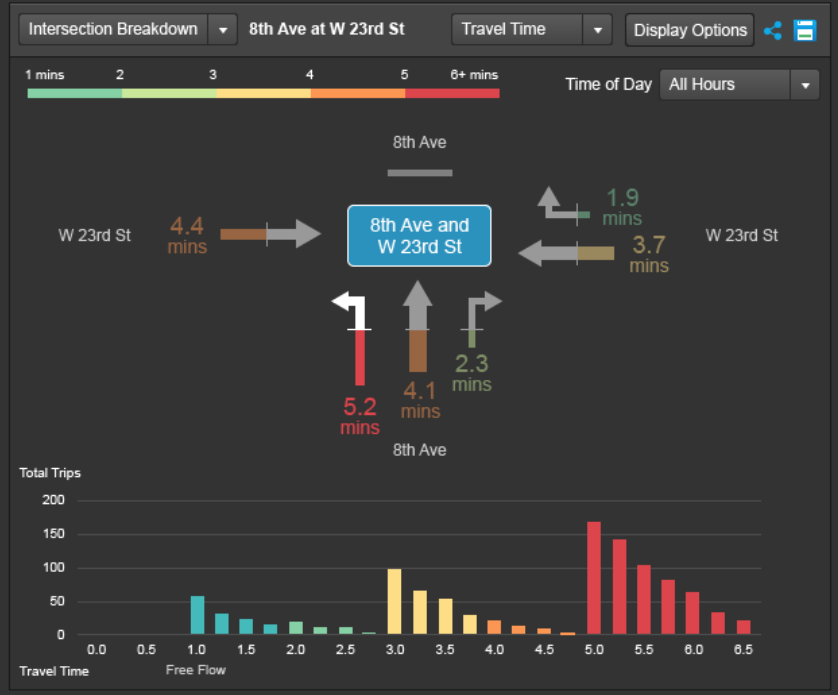
W 20th st and 10th ave
Average Travel Time through intersection
4.1 mins


Region
Zip code: 10011
Date range
05/10/2018 SMTWTFS
Travel Time
1 mins 2 3 4 5 6+ mins
W 23rd St and 8th Ave
4.4 mins
1.9 mins
3.7 mins
5.2 mins
4.1 mins
2.3 mins
Intersection Breakdown
12 AM
11 PM
W 30th St
W 31st St
W 36th St
W 33rd St
W 23rd St
W 25th St
W 27th St
W 21st St
W 17th St
W 15th St
W 9th St
E 34th St
E 32nd St
E 23rd St
E 14th St
E 12th St
E 10th St
E 8th St
Park Ave
Penn Plz
10th Ave
9th Ave
8th Ave
7th Ave
6th Ave
5th Ave
11th Ave
Avenue Of The Americas
Broadway
Park Ave S
3rd Ave
2nd Ave
1st Ave
Union Sq W
Lafayette St
West Side Hwy
West St
Hudson St
Bleecker St
7th Ave S
Joe Dimaggio Hwy
Morton St
King St

Ranked intersection movements in the 10011 zip code for the date range of 05/06/18 through 05/12/18

Rank	Map	Intersection	Approach	Movement	Volume	User Delay Cost	▲ Average Travel Time	25th Precentile	75th Precentile	5th Precentile	95th Precentile
1	☑	8th Ave at W 23rd St	Northbound	Left	489	$4,235.00	5.5 mins	2.5 mins	7.2 mins	1.5 mins	7.5 mins
2	☐	W 20th St at 8th Ave	Eastbound	Through	761	$4,194.00	5.2 mins	2.1 mins	6.9 mins	1.4 mins	7.1 mins
3	☐	W 19th St at 9th Ave	Westbound	Left	504	$4,895.00	5.0 mins	2.1 mins	6.8 mins	1.4 mins	6.9 mins
4	☐	W 23rd St at 8th Ave	Eastbound	Through	210	$2,305.00	4.9 mins	1.7 mins	7.1 mins	1.2 mins	7.2 mins
5	☐	W 20th St at 8th Ave	Westbound	Left	354	$3,204.00	4.7 mins	1.8 mins	6.6 mins	1.3 mins	6.8 mins
6	☐	7th Ave at W 17th St	Southbound	Through	159	$2,987.00	4.7 mins	1.5 mins	6.3 mins	1.2 mins	6.6 mins
7	☐	W 15th St at 11th Ave	Westbound	Left	263	$2,516.00	4.5 mins	1.4 mins	6.0 mins	1.1 mins	6.5 mins
8	☐	W 19th St at 6th Ave	Westbound	Right	186	$1,425.00	4.4 mins	0.8 mins	5.8 mins	0.6 mins	6.2 mins
9	☐	W 14th St at 7th Ave	Eastbound	Through	218	$1,546.00	4.3 mins	1.5 mins	5.6 mins	1.0 mins	6.0 mins
10	☐	W 21st St at 10th Ave	Eastbound	Left	135	$1,204.00	4.0 mins	0.7 mins	5.5 mins	0.5 mins	6.0 mins

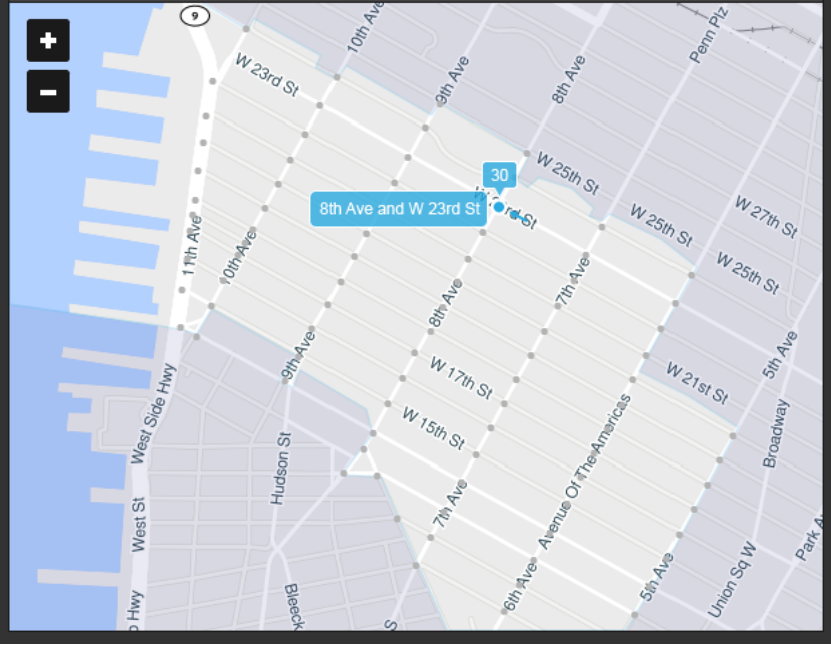




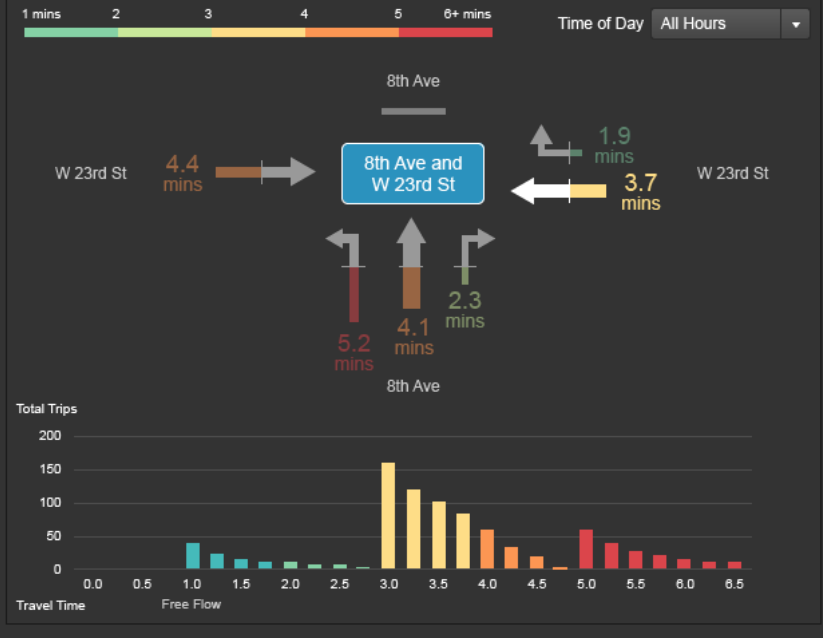
Ranked intersection movements in the 10011 zip code for the date range of 05/06/18 through 05/12/18

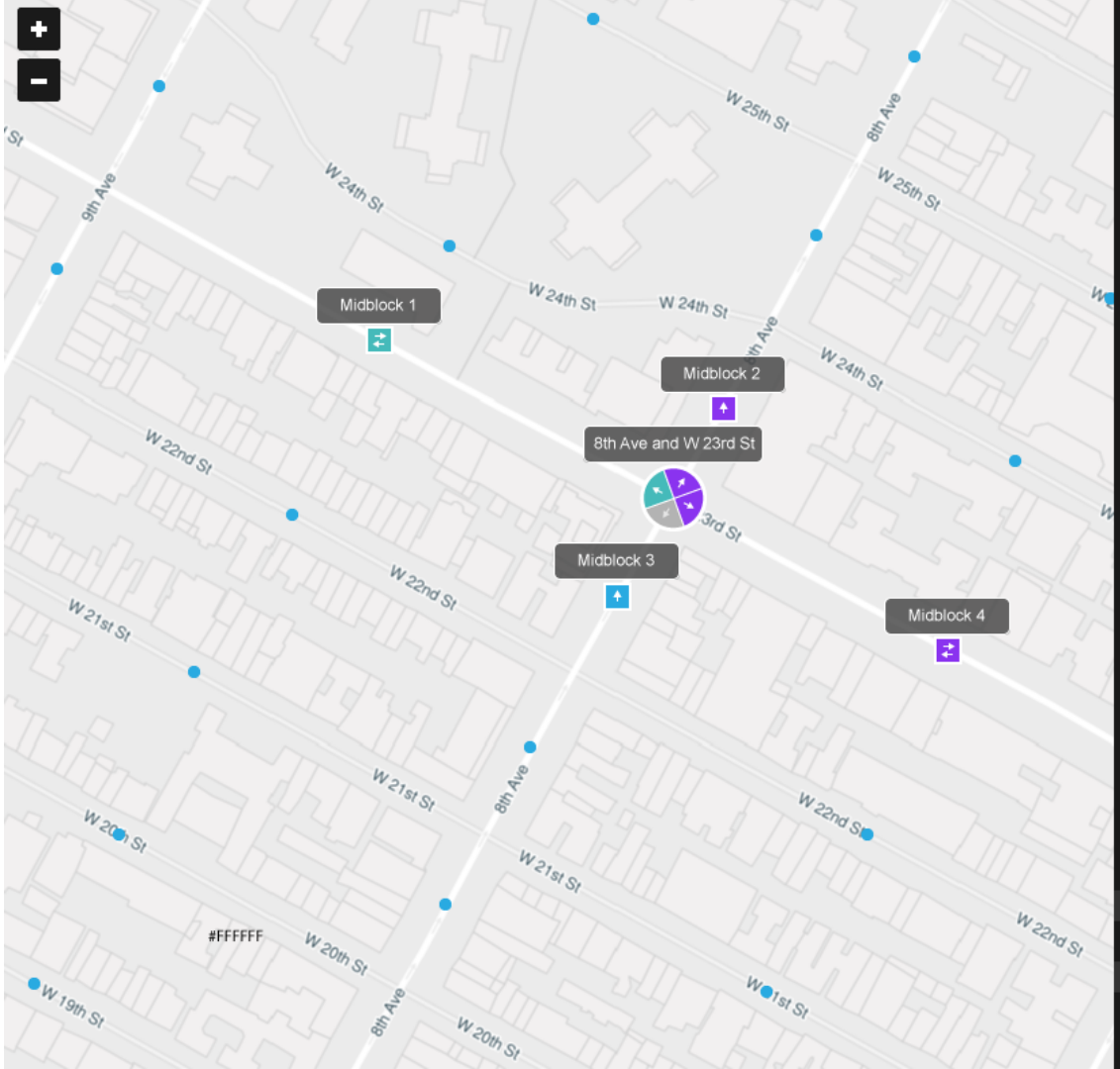
Rank	Map	Intersection	Approach	Movement	Volume	User Delay Cost	▲ Average Travel Time	25th Precentile	75th Precentile	5th Precentile	95th Precentile
1	☑	8th Ave at W 23rd St	Northbound	Left	489	$4,235.00	5.5 mins	2.5 mins	7.2 mins	1.5 mins	7.5 mins
2	☐	W 20th St at 8th Ave	Eastbound	Through	761	$4,194.00	5.2 mins	2.1 mins	6.9 mins	1.4 mins	7.1 mins
3	☐	W 19th St at 9th Ave	Westbound	Left	504	$4,895.00	5.0 mins	2.1 mins	6.8 mins	1.4 mins	6.9 mins
4	☐	W 23rd St at 8th Ave	Eastbound	Through	210	$2,305.00	4.9 mins	1.7 mins	7.1 mins	1.2 mins	7.2 mins
5	☐	W 20th St at 8th Ave	Westbound	Left	354	$3,204.00	4.7 mins	1.8 mins	6.6 mins	1.3 mins	6.8 mins
6	☐	7th Ave at W 17th St	Southbound	Through	159	$2,987.00	4.7 mins	1.5 mins	6.3 mins	1.2 mins	6.6 mins
7	☐	W 15th St at 11th Ave	Westbound	Left	263	$2,516.00	4.5 mins	1.4 mins	6.0 mins	1.1 mins	6.5 mins
8	☐	W 19th St at 6th Ave	Westbound	Right	186	$1,425.00	4.4 mins	0.8 mins	5.8 mins	0.6 mins	6.2 mins
9	☐	W 14th St at 7th Ave	Eastbound	Through	218	$1,546.00	4.3 mins	1.5 mins	5.6 mins	1.0 mins	6.0 mins
10	☐	W 21st St at 10th Ave	Eastbound	Left	135	$1,204.00	4.0 mins	0.7 mins	5.5 mins	0.5 mins	6.0 mins

Map | Display Options



Intersection Breakdown | 8th Ave at W 23rd St | Travel Time | Display Options

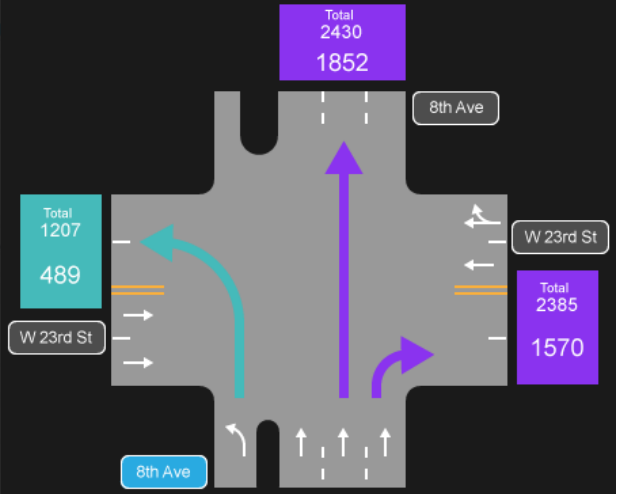




Intersection
8th Ave and W 23rd St

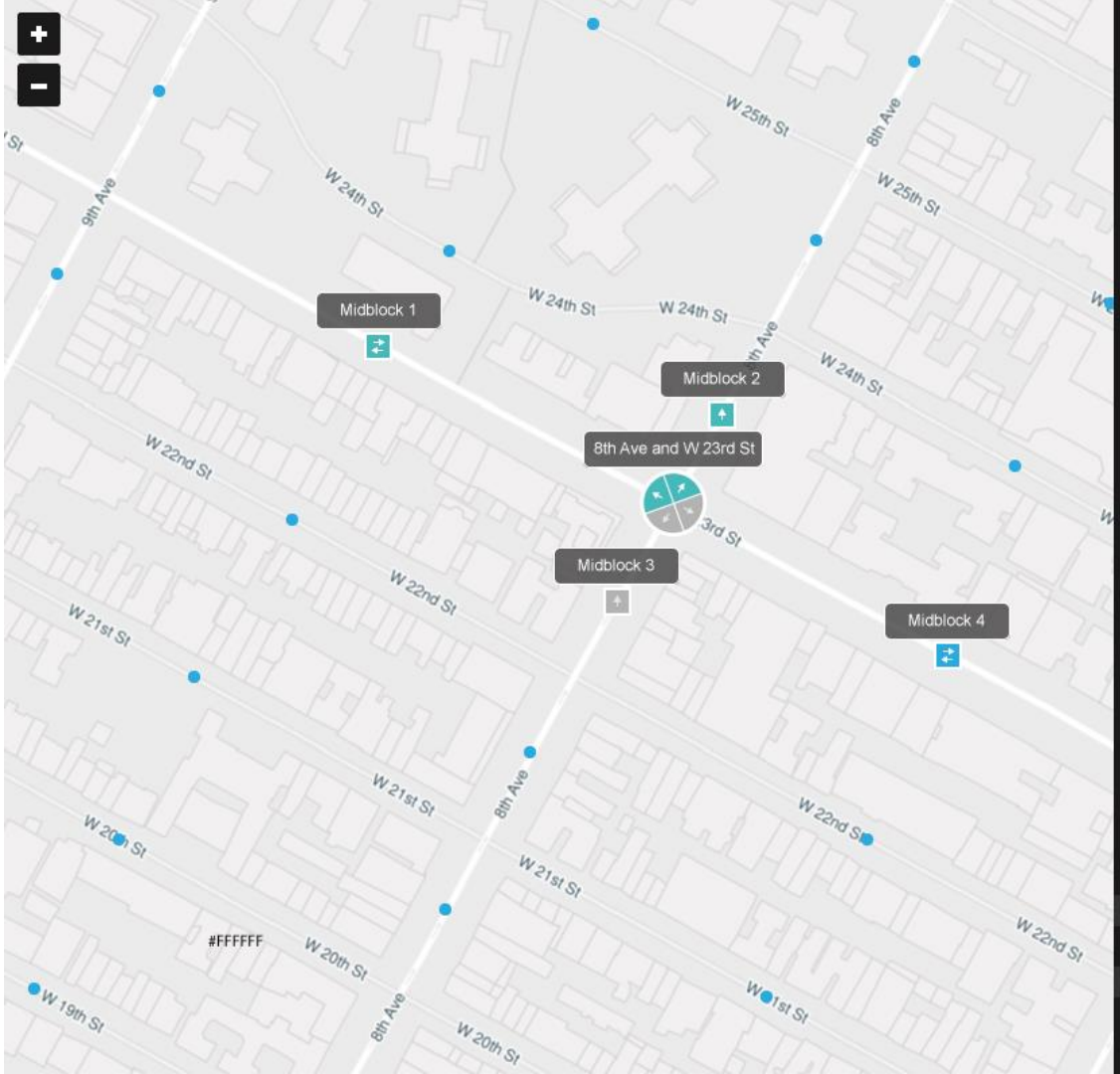
Date range
05/10/2018 SMTWTFS

Metric
Number of vehicles passed through



Midblock	Trips from intersection to midblock	6AM - 9AM	12PM - 3PM	6PM - 9PM
Midblock 1	1207	415	248	544
Midblock 2	2430	830	529	1071
Midblock 3	0	0	0	0
Midblock 4	2385	802	787	796

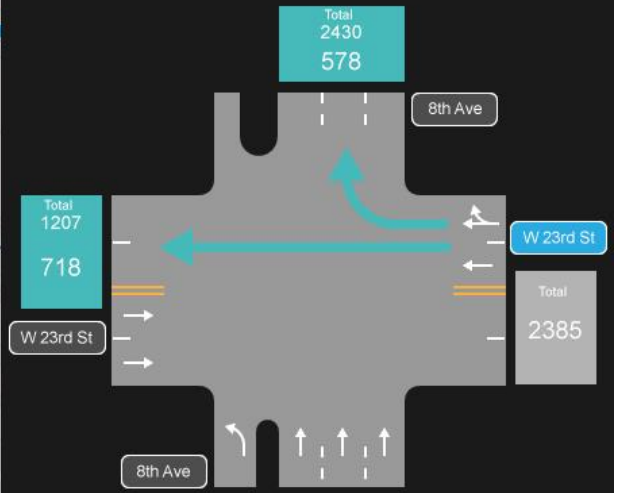
0 - 500 | 500 - 1000 | 1000 - 1500 | 1500 - 2000 | 2000 - 2500



Intersection
8th Ave and W 23rd St

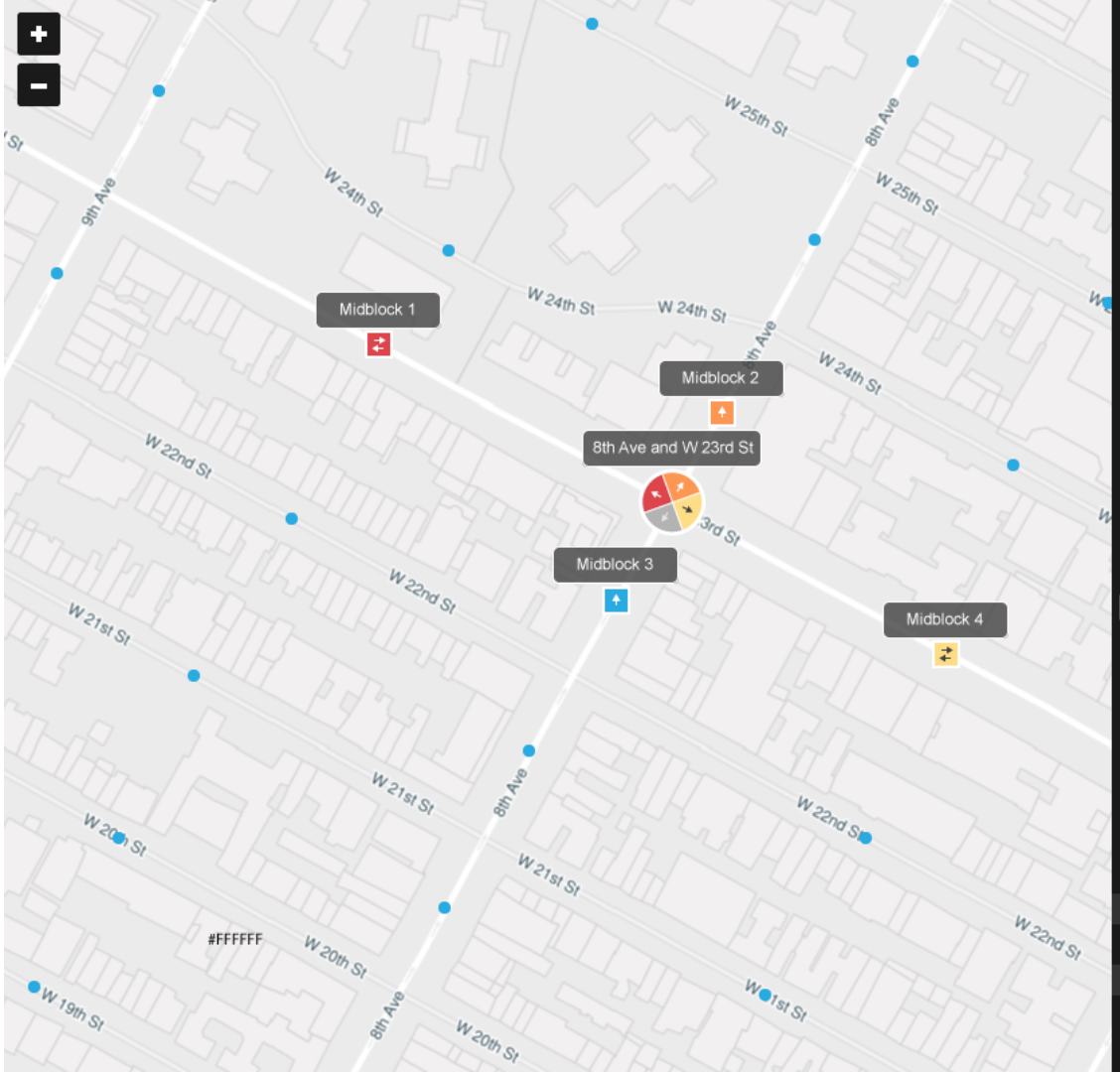
Date range
05/10/2018 SMTWTFS

Metric
Number of vehicles passed through



Midblock	Trips from intersection to midblock	6AM - 9AM	12PM - 3PM	6PM - 9PM
Midblock 1	1207	415	248	544
Midblock 2	2430	830	529	1071
Midblock 3	0	0	0	0
Midblock 4	2385	802	787	796

0 - 500 | 500 - 1000 | 1000 - 1500 | 1500 - 2000 | 2000 - 2500



Intersection

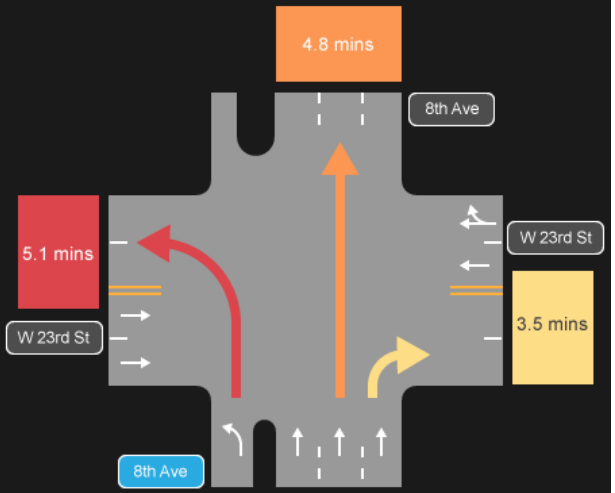
8th Ave and W 23rd St

Date range

05/10/2018 SMTWTFS

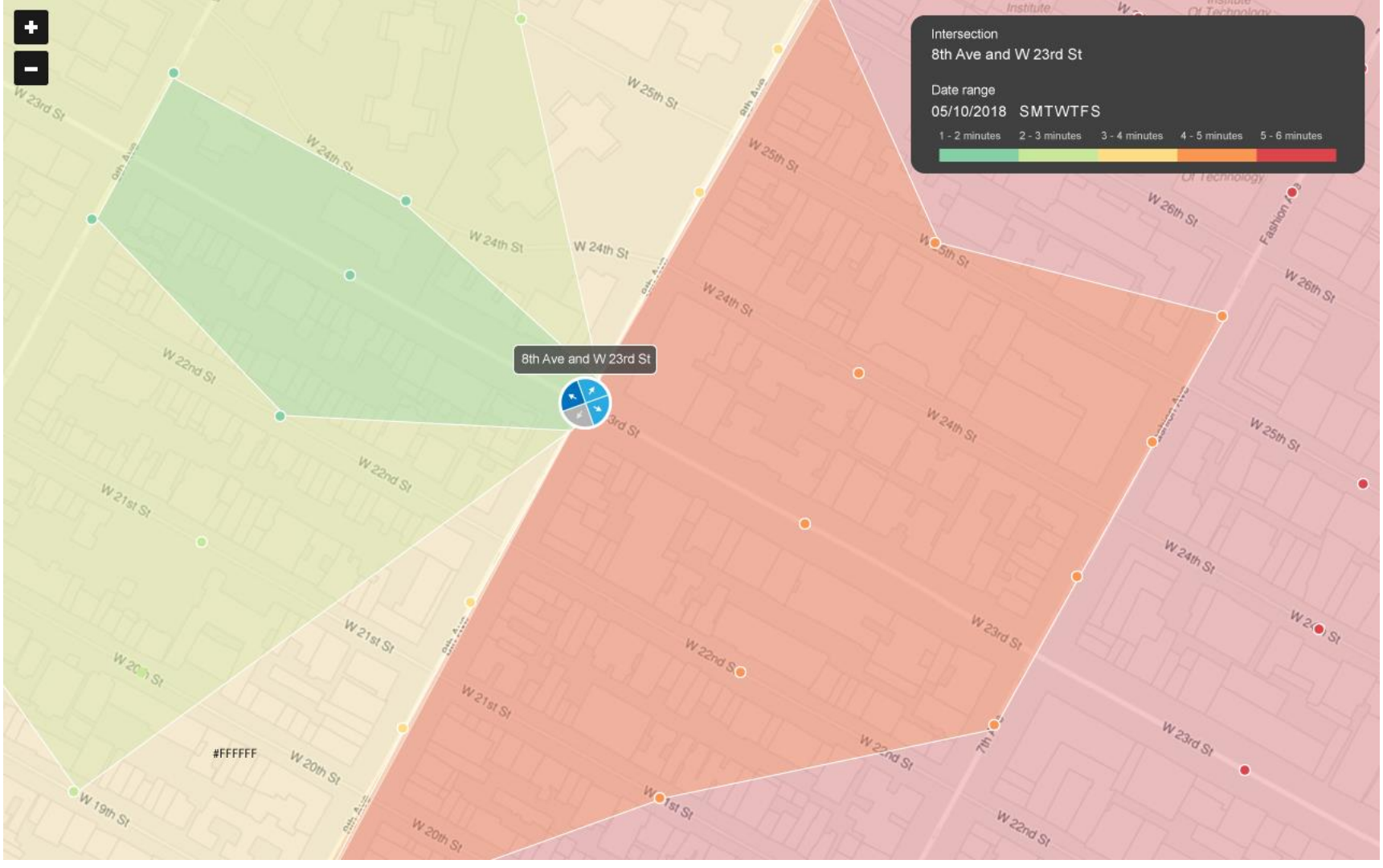
Metric

Travel time through intersection



Midblock	Avg Travel Time to midblock	6AM - 9AM	12PM - 3PM	6PM - 9PM
Midblock 1	5.5 mins	5.9 mins	5.1 mins	5.4 mins
Midblock 2	4.2 mins	4.5 mins	3.8 mins	4.2 mins
Midblock 3	-	0	0	0
Midblock 4	3.1 mins	3.6 mins	2.9 mins	2.7 mins

1 - 2 minutes 2 - 3 minutes 3 - 4 minutes 4 - 5 minutes 5 - 6 minutes


Intersection
8th Ave and W 23rd St
Date range
05/10/2018 SMTWTFS
1 - 2 minutes
2 - 3 minutes
3 - 4 minutes
4 - 5 minutes
5 - 6 minutes
8th Ave and W 23rd St
W 23rd St
W 24th St
W 25th St
W 22nd St
W 21st St
W 20th St
W 19th St
W 26th St
#FFFFFF

Next Steps

- Development is in-progress
- Hoping to test with agencies in the next few months
- Experimenting with data density
- Developing additional features, functionality, and usability

RITIS + Trajectory Data + Signal Counts (for select features) =

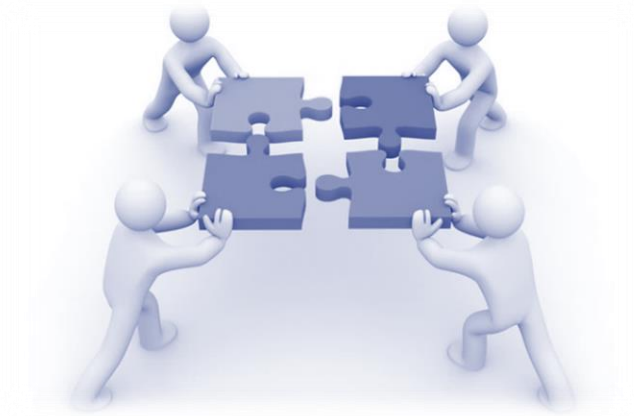
For Additional Information, contact:

Michael Pack

UMD CATT Lab

PackML@umd.edu

Questions?



Remaining Questions from the CHAT Box

Wrap Up

Meeting information & presentations will be posted to the I-95 Corridor Coalition website. Participants will receive a link to the presentations after they are posted.

Contact Information

I-95 Corridor Coalition

- Denise Markow, PE, I-95 Corridor Coalition, TSMO Director - dmarkow@i95coalition.org, 301-789-9088

Speakers

- Joe Guthridge, HERE - joe.guthridge@here.com
- Rick Schuman, INRIX - rick@inrix.com
- Dr. Sepehr Ghader, UMD Maryland Transportation Institute - sghader@umd.edu
- Dr. Mark Franz, CATT Lab - mfranz1@umd.edu
- Michael Pack, CATT Lab - packml@umd.edu

Thank You!