#### TRANSPORTATION RESEARCH BOARD

# TRB Webinar: Visualizing Transportation System Performance

# May 17, 2021 1:00- 3:00 PM Eastern

@NASEMTRB
#TRBwebinar

# PDH Certification Information:

•2 Professional Development Hours (PDH) – see follow-up email for instructions

•You must attend the entire webinar to be eligible to receive PDH credits

•Questions? Contact Reggie Gillum at <u>RGillum@nas.edu</u>

# **#TRBwebinar**

The Transportation Research Board has met the standards and requirements of the Registered **Continuing Education Providers** Program. Credit earned on completion of this program will be reported to RCEP. A certificate of completion will be issued to participants that have registered and attended the entire session. As such, it does not include content that may be deemed or construed to be an approval or endorsement by RCEP.



**REGISTERED CONTINUING EDUCATION PROGRAM** 

# **Learning Objectives**

- Describe how visualization approaches can report transportation system performance to a broad audience
- Identify benefits of visualization techniques

# **#TRBwebinar**



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The National Academies of SCIENCES • ENGINEERING • MEDICINE

# **#TRBwebinar**



# VISUALIZING TRANSPORTATION SYSTEM PERFORMANCE

MAP-21 Reliability Measure Target Setting Approach for Interstates in Virginia

Traffic Engineering Division, VDOT Simona Babiceanu || Sanhita Lahiri, P.E., PTOE

May 17, 2021

# **Please Note!**

## **Disclaimer:**

The visualizations, and the interpretations shared in this presentation are from our <u>ongoing research</u> on MAP-21 Reliability Measure Target Setting methodology for Interstates in Virginia. While these interim findings will inform the methodology, as the research progresses and new findings surface, we will keep refining the direction towards the final methodology.

# **MAP-21** Reliability Performance Measures



### **Interstate Travel Time Reliability Measure:**

Percent of person-miles traveled that are reliable per year

Condition of Segment Unreliability -

- − Level of Travel Time Reliability (LOTTR)  $\ge$  1.5
- Even if one NHPP time period is unreliable
- $LOTTR = \frac{80 \text{th percentile Travel Time}}{50 \text{th percentile Travel Time}}$

Calculated –

- For each NHPP time period
- For the entire year

National Highway Performance Program (NHPP) Time Periods:

Weekdays:

- 6a 10a (AMP)
- 10a 4p (MIDD)
- 4p 8p (PMP)

Weekends

• 6a - 8p (WE)

# **MAP-21 Interstate Reliability Measure**



 $IS_TT_Reliability = \frac{\sum_{r=1}^{RI} (SL) \times [DIR (AADT)] \times (number of days in the data year) \times [OCC_FAC]_r}{\sum_{r=1}^{IS} (SL) \times [DIR (AADT)]_r \times (number of days in the data year) \times [OCC_FAC]_r} \times 100$ 

Percent of person-miles traveled that are reliable for a year (%PMTR) for the Interstate System in VA

Must be calculated by that year's

- NPMRDS data set
- TMC network (2021 submittal will be by 2020 TMC network)

**TT Reliability:** https://www.fhwa.dot.gov/tpm/guidance/hif18024.pdf **HPMS Guidance:** https://www.fhwa.dot.gov/tpm/guidance/pm3\_hpms.pdf

- Variables that can change based on *Change in TMC Network*:
  - IS Total number of reporting segments on the Interstate NHS System
  - SL Segment Length i.e. the length of a TMC (same TMC ID)
  - AADT\*\*

# **Develop Model for Target Setting**

- 1. Establish Model
  - Relationship between multiple independent variables and LOTTR\*
- **2. Determine Statistical Significance of independent variables**
- 3. Validate model
  - Compare predicted vs
     actual LOTTR

\*LOTTR or a dependent variable that can be used to calculate LOTTR



# Target Setting Plan Predict Reliability

- 1. Project future variables (Volume, number of lanes, etc)
- 2. Estimate future LOTTR for future Variables
  - Each Segment
  - Each Time Period
- 3. Estimate %PMTR for future year

## **Set Target for Percent of Person Miles traveled Reliable**

- ✓ Estimated %PMTR
- ✓ Strategic Considerations

**Data Issues** 

## **TMC** Network Segments – Inconsistent Inclusion



#### TRB Webinar MAP-21 Reliability Measure Target Setting Approach for Interstates in Virginia

ArcGIS

#### **Data Source**

## **Data Source for Independent Variables**

Roadway Geometry	Urban Category	Traffic
<ul> <li>VDOT Internal Database</li> <li>Google Earth</li> <li>Network – NPMRDS Data Set</li> </ul>	US Census Designations	<ul> <li>VDOT Internal Database</li> <li>Hourly Volume Profile</li> <li>Heavy Vehicle %</li> <li>RITIS NPMRDS</li> <li>AADT, Travel Time</li> </ul>
	Poadway	Operations
Event	Improvement Projects	Improvement Programs

\* Not yet Applied in Model

# **Concurrent Visualization**





# **Concurrent Visualization – By Corridor**



# **Example:**

I-95 NB, Stafford County, AM Peak

- Unreliable in 3 years
- High Truck % upstream of Unreliable section
- Crashes vary from year to year
- High Volume

Strategic Considerations for Corridor Section with multiple needs (economic, multimodality, etc. not shown):

- Will the planned Projects/Programs improve reliability to push LOTTR below 1.5?
- If NOT No contribution towards State's Reliability Target



# **Concurrent Visualization**



× Tableau - LOTTR maps <u>(\_\_\_)</u> File Data Worksheet Dashboard Story Map Format Server Window Help Thow Me 蕃 Dashboard Layout rel/unrel 2020 rel/unrel 2018 rel/unrel 2017 unrel all years rel/unrel 2019 Default Phone District of District of District of District of Device Preview District of lumbia Clumbia Size Custom size (1800 x 800) Sheets 1 2019 PMP 1 2017 AMP 2017 AMP (2) rel/unrel 2017 rel/unrel 2018 In rel/unrel 2019 rel/unrel 2020 ill rel all years unrel all years Objects Web Page [] Horizontal H Vertical Blank A Text Button Image 5 Extension Floating 58 Show dashboard title (58) (58 Manbox @ OSM 2019 PMP 2017 AMP 2017 AMP (2) rel/unrel 2017 rel/unrel 2018 rel/unrel 2019 rel/unrel 2020 rel all years 🖽 Dashboard 1 🖳 🖽 🛄 O Data Source

# **Reliability Relationship on Virginia Interstate**



20th Perc. Speed (Surrogate for 80th Perc. Travel Time)

#### Describe Trend Model **Trend Lines Model** A linear trend model is computed for sum of Lottr given sum of spd 20PCT. The model may be significant at p <= 0.05. Model formula: (spd 20PCT + intercept) Number of modeled observations: 27271 Number of filtered observations: 0 Model degrees of freedom: 2 Residual degrees of freedom (DF): 27269 SSE (sum squared error): 1372.58 MSE (mean squared error): 0.0503348 R-Squared: 0.506735 Standard error: 0.224354 p-value (significance): < 0.0001 Individual trend lines: Panes Line Coefficients <u>Value</u> <u>Row</u> <u>Column</u> <u>p-value</u> DF <u>Term</u> <u>StdErr</u> Lottr spd 20PCT < 0.0001 27269 spd 20PCT -0.021488 0.0001284 -167.373 < 0.0001 intercept 2.34959 0.0075514 311.145 < 0.0001 Copy

MAP-21 Reliability Measure Target Setting Approach for Interstates in Virginia TRB Webinar



t-value

p-value

Close

×

# **Reliability Relationship on Virginia Interstate**



20th Perc. Speed (Surrogate for 80th Perc. Travel Time)

NHPP Period, Reliable AMP, Reliable MIDD, Reliable MIDD, Unreliable PMP, Reliable PMP, Unreliable WE, Reliable WE, Unreliable

### Strategic Considerations for TMCs that are Reliably Congested:

Tableau

 Will the planned Projects/Programs push LOTTR above 1.5?

If YES – It is a detriment to State's reliability Target

# **Travel Time and Speed**

Travel Time Scatter Plot





## LOTTR and Road Events

LOTTR vs. Events . . : LOTTR 100 110 120 130 Lane-Impacting Incident Rate Equivalent PDO Rate

# LOTTR and TMC Lengths



TMC Length Histogram by VDOT District for Segments with Length < 2 miles



# Model Development Model

# **Linear Regression Models**

Assumption = Dependent variable is a linear combinations of these factors

$$Y = \beta_0 + \beta_1 * \mathbf{X_1} + \beta_2 * \mathbf{X_2} + \beta_3 * \mathbf{X_3} + \dots + \beta_n * \mathbf{X_n}$$

- Estimate coefficients  $\beta_1$ ,  $\beta_{2,}\beta_{3,...,}\beta_n$  and the free term  $\beta_0$  from observed data
- Advantage = simplicity

#### Data Types

# Independent Variables with Potential for Influencing Reliability

Roadway Geometry	Urban Category	Traffic					
<ul> <li>Number of Lanes</li> <li>Segment Length</li> <li>Terrain</li> <li>On/Off Ramp location*</li> </ul>	<ul><li>Urbanized</li><li>Urban Cluster</li><li>Rural</li></ul>	<ul><li>Volumes</li><li>Heavy Vehicle %</li></ul>					
Event	Roadway Improvement Projects	Operations Improvement Programs					
<ul> <li>Lane Impacting Incident Rate</li> <li>Equivalent Property</li> </ul>	<ul> <li>Capacity Improvement*</li> <li>Add/Modify</li> </ul>	<ul> <li>Safety service Patrol*</li> </ul>					

### Model Development

## **Dependent Variables Considered**

Variable	Formula							
LOTTR	N/A							
LOG (LOTTR)	N/A							
80 <sup>th</sup> Percentile Travel Time	80th percentile Travel Time							
50 <sup>th</sup> Percentile Travel Time	$\frac{1011 \text{ K}}{50 \text{ th percentile Travel Time}}$							
50 <sup>th</sup> Percentile Speed	Surregate LOTTR _ 50th percentile Speed							
20 <sup>th</sup> Percentile Speed	1000000000000000000000000000000000000							
LOG(80 <sup>th</sup> Percentile Travel Time)	<b>EXP(80th percentile Travel Time)</b>							
LOG(50 <sup>th</sup> Percentile Travel Time)	$\frac{1011 \text{ K}}{\text{EXP}(50 \text{ th percentile Travel Time})}$							
LOG(50 <sup>th</sup> Percentile Speed)	EXP(50th percentile Speed)							
LOG(20 <sup>th</sup> Percentile Speed)	$\frac{1}{EXP(20th \text{ percentile Speed})}$							

### Model Development

# Model Run Results (PRELIMINARY EXAMPLE)

		MODEL - /	ALL DATA	<b>\</b>	МС	DEL - REI		ATA	MODEL - UNRELIABLE DATA					
term	LOG(50th I Travel Time	Percentile e)	LOG(80th F Travel Time	Percentile e)	LOG(50th Travel Tim	Percentile e)	LOG(80th Travel Tim	Percentile e)	LOG(50th Travel Tim	Percentile e)	LOG(80th Percentile Travel Time)			
	β <sub>i</sub>	significant	β <sub>i</sub>	significant	β <sub>i</sub>	significant	β <sub>i</sub>	β <sub>i</sub> significant		significant	β <sub>i</sub>	significant		
(Intercept)	2.75879	Y	2.84165	Y	2.79447	Y	2.84915	Y	1.56843	Y	2.29988	Y		
Equivalent Property Damage Only Rate	0.00199	Y	0.00229	Y	0.00186	Y	0.00201	Y	0.00275	N	0.00258	N		
Lane Impacting Incident Rate	-0.02400	Y	-0.00862	Y	-0.02630	Y	-0.02100	Y	-0.00280 N		0.00054	Ν		
Volume	0.00765	Y	0.00933	Y	0.00741	Y	0.00813	Y	0.00694	Y	-0.00113	Ν		
Number of Lanes	0.03406	Y	0.01019	Ν	0.02936	Y	0.02063	Y	0.03510	Ν	0.10773	Y		
Heavy Vehicle %	0.00123	N	-0.00027	Ν	0.00087	Ν	0.00010	N	-0.00218	Ν	-0.00151	N		
Terrain	0.09938	Y	0.10363	Y	0.09444	Y	0.09338	Y	0.49379	Y	0.38013	Y		
Urban Cluster	-0.02521	N	-0.00891	Ν	-0.03324	Ν	-0.02259	N						
Urbanized	-0.14381	Y	-0.13829	Y	-0.14584	Y	-0.14411	Y	0.71230	Y	0.82918	Y		
Segment Length	0.56121	Y	0.56003	Y	0.55633	Y	0.55554	Y	0.99957	Y	0.98362	Y		
R-squared	0.66408		0.64163		0.67383		0.66842		0.51292		0.45680			
Adjusted R-squared	0.66397		0.64151		0.67372		0.66831		0.50960		0.45310			
Sample Size	27271		27271			-			-					

#### **Model Validation**

### Estimated vs Observed LOG(%-tileTravel Time) (PRELIMINARY EXAMPLE)



### **Model Validation**

# Estimated vs Observed LOTTR (PRELIMINARY EXAMPLE)

#### Estimated vs. Observed LOTTR



#### **Model Validation**

# % PMTR

Year	Estimated PMTR	Observed PMTR
2017	100.00%	84.46%
2018	98.87%	83.45%
2019	98.15%	84.44%
2020	100.00%	93.63%



# **Questions?**

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Simona Babiceanu

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Acknowledgment:

Iteris

- Katie McCann, VDOT
- Mena Lockwood, VDOT
- Ralph Jones, VDOT
- Jonathan Robbins, VDOT/OIPI

- Brian King, VDOT

# Visualizing Transportation System Performance

ORGANIZED BY:

TRB STANDING COMMITTEE ON VISUALIZATION IN TRANSPORTATION (AED80)

May 17, 2021 - 1:00 PM ET

# TRB Standing Committee on Visualization in Transportation (AED80)

Our goal: to use visualization to identify and address critical transportation issues of today, and to develop innovative visualization approaches to meet society's transportation needs of the future.

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- Subcommittee on Building Information Modeling (BIM)
- Subcommittee on Performance Visualization
- Subcommittee Interactive Simulation

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- Peer review papers for the Transportation Research Record.
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It Committee Name

Standing Committee on Visualization in Transportation

Hold committee meetings at the TRB Annual Meeting.Plan specialty conferences.



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Committee Code

# Today's Webinar

#### **Visualization of VDOT MAP-21 Target Setting**

Sanhita Lahiri and Simona Babiceanu, Virginia Department of Transportation

### **Visualizing the FDOT Source Book**

Jessica VanDenBogaert, Florida Department of Transportation

### Visualizing Automated Traffic Signal Performance Measures (ATSPM)

Alan Davis, Georgia Department of Transportation

### **Questions & Answers**

Moderated by Charles Lattimer, University of Maryland

# **Questions?**

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Florida Department of Transportation





Visualizing System Performance at FDOT

5/17/2021





Sralegic development

# **The FDOT Source Book**

### 2006

	In Section G2:	Highways (	Congested: % Centerlin	e Miles Cor	gested Peak Near		Highwa	iys Conges de, by Facili	sted: % Ce	enterline l	Miles Con	gested				Peak Hour	Highways Cong Statewide, by Are	ested: % a Tape	Centerline	Miles Co	ongested		
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<ul> <li>A larkov Bi Pasychia and Stranger Calculation models. If may not be the bloor of grandet that be own of grandet that be own</li></ul>	Area Type: Statewide, Seven Counties with highest population, other urbanized counties, and non-urbanized counties. Facility Type: Interstate, Tumpike, Other FiHS, and Other (non-FiHS) SHS.	2006	SHS Total SIS Routes Emerging SIS Routes SIS Connectors Emerging SIS Connectors SIS Routes Total Other SHS	13.4% 14.6% 2.6% 15.7% 33.5% 12.5% 13.2%	30.31x 38.15x 0.75x 2155x 10000x 37.45x 25.35x	10.7% 0.7 12.8% 0.3 11.2% 1.0 2.3% 0.0 34.8% 0.0 12.6% 0.5 21.2% 1.0	200 200 200 200 200 200 200 200 200 200		•								0 15.0% -		-	•		•	×
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	% Miles Congested: The number of centerline miles of roads that are congested during the peak hour, divided by the total number of centerline miles.	2009	SHS Total SIS Routes Emerging SIS Routes SIS Connectors Emerging SIS Connectors SIS Routes Total Other SHS	9.4% 10.8% 1.7% 16.5% 3.5% 9.2% 9.5%	238x 30.12x 0.52x 15.52x 73.22x 23.6x 19.64x	10.5% 0.4 6.5% 0.00 5.5% 0.5% 16.7% 0.00 0.0% 0.00 6.8% 0.3 12.5% 0.50	20 200 20 X X X X X X X X X X X X X X X	5. 5.	-			•	•	•	•		35.0% - 25.0% - 00 25.0% -	×	-*	×	x		x :
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TOC A.Intro B1 People B2 Roads B3 Usage C. Current D. Historical E1-VMT E2-PMT E3-TMT F1-Speed F2-Delay F3-PDelay G1-VperLM G2-%MI Cong G3+%Tr Cong G4-Durati      E1 C		2011	SHS 101al SHS Routes Emerging SIS Routes SIS Connectors Emerging SIS Connectors SIS Routes Total Other SHS		0.0% 0.0% 0.0% 0.0%	0.0% 0.0 0.0% 0.0 0.0% 0.0 0.0% 0.0 0.0% 0.0		s S <sup>an</sup> s	į į	وم SIS Roate	ge <sup>b</sup> stola	States Called •SIS F	er Year with s	51 <sup>06</sup> •E1	and and a state of the state of	a <sup>st</sup>	0.0%	Real P	d <sup>3</sup> ▲SIS Rodes To	gab u	Calendar Year X7 Largest	A d ×Ster	dit.
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#### 🐏 PERSON HOURS OF DELAY

#### People > Quality > Auto/Truck >

#### METHODOLOGY

Person hours of delay is calculated as the product of directional hourly volume, average vehicle occupancy, and the difference between travel time at "threshold" speeds and travel time at the average speed. The thresholds are based on LOS B as defined by FDOT.

#### CALCULATION

Σ (Daily or Peak Travel Time-Travel Time at LOS B) × Peak Volume × Average Vehicle Occupancy

#### REPORTING PERIODS

☑ Peak hour □ Peak period ☑ Daily ☑Yearly

#### OBSERVATION

From 2015 to 2016, person hours of delay along Florida's SHS went up by nearly 14% during peak hours. Better data capturing techniques and increased person miles traveled partially explain the increase.

#### SOURCES

- FDOT Traffic Characteristics Inventory
- U.S. DOT National Household Travel Survey 2009 Florida Add-On
- HERE Technologies Travel Time Data

Person Hours of Delay on SHS by Area During Peak Hour Thousands



Person Hours of Delay on SHS by Facility Type During Peak Hour



🖓 Go to Contents or Go to Data

32

2017

250

Thousands

# 2019: Let's Get Visual

FDOTSourceBook.com


#### **The FDOT Source Book**

#### Home



#### ➡ Vehicle Miles Traveled

Vehicle miles traveled (VMT) measures the amount of travel for all vehicles in a geographic region over a given period of time. VMT is calculated by adding up all the miles driven by all the cars and trucks on all the roadways in a region. This metric plays an integral role in the transportation planning, policy-making, and revenue estimation processes due to its ability to indicate travel demand and behavior.

Travel on Florida's State Highway System (SHS) has been steadily increasing since 2014. Between 2014 and 2018, vehicle miles traveled on Florida's SHS during the peak hour increased by 16.3%.

Methodology 🖸 Segment-Level Visualization 🗹



**A A** # 8 # # ₩. A

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### **Customizations**

### Choose time period

- Daily
- Peak Hour
- Peak Period

### Choose comparison year



## **Customizations**

### **Choose geographies**

- FDOT District
- County
- Multiples in any combination



### Aviation Passenger Boardings

Choose an individual airport or group of airports.





FDOT

**The FDOT Source Book** 

Download Source Book



III

FDOT

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# Other System Performance Visualizations

## **Source Book: Special Edition 2020**





## **Safety Data Integration Space**





### Visualizing Accessibility

- Experiment with ArcGIS
- Total jobs within 20 mins



# Source Book: The Next Generation

- Streamline access and navigation
- Reduce number of clicks
- Remove barrier between area and segment visualization
- Data structure to support future growth



### Florida Department of Transportation





### Jessica VanDenBogaert

### Forecasting and Trends Office

605 Suwannee Street Tallahassee, FL 32399 Phone: 850-414-4631 Email: Jessica.VanDenBogaert@dot.state.fl.us



# Visualizing Traffic Signal Performance Using ATSPM

SigOps | Office of Traffic Operations May 2021

### SigOps

GDOT divides our operations and maintenance of signals into six main regions throughout the state, providing active management to the entire region:

- North
- Southwest
- Southeast
- Western Metro
- Central Metro
- Eastern Metro



Automated Traffic Signal Performance Measures



### **Built Around High Resolution Data**

- Set of standard enumerations developed through a pooled fund study with Indiana DOT and Purdue University
- 1/10<sup>th</sup> second resolution
- Vendor input and implementation
- Intended to be agnostic of software/vendor/system
- <u>https://docs.lib.purdue.edu/jtrpdata/4/</u>

Enume	erations			SignalID	Timestamp	EventCode	EventPara	
				1	1	2021-04-19 00:00:00.000	150	7
Event				2	1	2021-04-19 00:00:00.000	316	100
Code	Event Descriptor	Parameter	Description		1	2021-04-19 00:00:00.000	318	12
Event bescriptor		- didinotor	Decomption		1	2021-04-19 00:00:00.000	320	0
Active Phase Events:						2021-04-19 00:00:00.000	323	37
0	Phase On	Phase # (1-255)	Set when NEMA Phase On becomes active, either upon start of green or walk interval,	6	1	2021-04-19 00:00:12.000	13	2
				7	1	2021-04-19 00:00:12.000	13	6
			whichever occurs first.		1	2021-04-19 00:00:12.000	150	5
1	Phase Begin Green	Phase # (1-255)	Set when either solid or flashing green indication has begun. Do not set repeatedly during flashing operation		1	2021-04-19 00:00:17.500	46	4
					1	2021-04-19 00:00:17.500	48	4
			during nashing operation.	11	1	2021-04-19 00:00:17.600	50	4
2	Phase Check	Phase # (1-255)	Set when a conflicting call is registered against the active phase. (Marks beginning of MAX timing)		1	2021-04-19 00:00:17.600	131	37
					1	2021-04-19 00:00:17.600	132	75
2	Dhoos Min Complete	Dhose # (1 255)	Sat when phase min timer every	14	1	2021-04-19 00:00:17.600	133	62
2	Phase win Complete	Phase # (1-255)	Set when phase min timer expires.	15	1	2021-04-19 00:00:17.600	135	49
4	Phase Gap Out	Phase # (1-255)	Phase termination due to gap out termination condition. Set once per phase when phase gaps out but may not necessarily occur upon phase termination.	16	1	2021-04-19 00:00:17.600	137	26
				17	1	2021-04-19 00:00:17.600	139	49
				18	1	2021-04-19 00:00:17.600	150	1
5	Phase Max Out	Phase # (1-255)	Set when phase MAX timer expires but may not necessarily occur upon phase termination due to last car passage or other	19	1	2021-04-19 00:00:17.600	150	3
-				20	1	2021-04-19 00:00:18.500	47	4
				21	1	2021-04-19 00:00:18.500	49	4
			features.		1	2021-04-19 00:01:00.000	323	17
6	Phase Force Off	Phase # (1-255)	Set when phase force off is applied by the coordinator to the active green phase.		1	2021-04-19 00:01:02.000	13	2
					1	2021-04-19 00:01:02.000	13	6
7	Phase Green Termination	Phase # (1-255)	Set when phase green indications are	25	1	2021-04-19 00:01:02.000	150	5
			terminated into either yellow change interval or permissive (FYA) movement.		1	2021-04-19 00:01:07.500	46	4
					1	2021-04-19 00:01:07.500	48	4
8	Phase Begin Yellow Change	Phase # (1-255)	Set when phase yellow indication becomes	28	1	2021-04-19 00:01:07.600	47	4
			active and interval timer begins.	29	1	2021-04-19 00:01:07.600	49	4
9	Phase End Yellow Change	Phase # (1-255)	Set when phase yellow indication becomes		1	2021-04-19 00:01:07.600	50	4
			inactive.	31	1	2021-04-19 00:01:07.600	131	17
10	Phase Begin Red	Phase # (1-255)	Set only if phase red clearance is served. Set when red clearance timing begins.		1	2021-04-19 00:01:07.600	132	75
	Clearance	1 N N			1	2021-04-19 00:01:07.600	133	62





### Web-based Tool for Performance Measures

- Open-sourced platform originally developed by Utah DOT
- Multiple contributors back to platform
- Over 7,000 signals in GDOT's platform
- <u>https://traffic.dot.ga.gov/atspm</u>



### Visualization Examples

#### **Purdue Phase Termination**

- Displays phase terminations over period of time
- Effective for finding recurring maintenance or operations issues
- Often shines spotlight on issues a field visit would not identify



### Visualization Examples

#### Purdue Coordination Diagram

- Red line is the start of the red phase
- Yellow line is start of the yellow phase
- Green line is start of the green phase
- Black dots represent vehicles crossing over detectors
- Provides excellent view of intersection progression

#### Purdue Coordination Diagram

SR 42 @ I-20 WB - SIG#7010 Wednesday, August 2, 2017 12:00 AM - Wednesday, August 2, 2017 11:59 PM Advanced detector located 260 ft. upstream of stop bar

#### Phase 6: Southbound



### Visualization Examples

#### **Purdue Split Failure**

 Demand is present after the phase terminates for minor movements



#### Purdue Split Failure

### Visualization Innovation

Left turn gap analysis

 Developed by GDOT to visualize where permissive left turn movements did not have adequate gaps in opposing thru traffic.



#### Left Turn Gap Analysis

SR 92 @ Professional Way - SIG#6328 Wednesday, May 5, 2021 12:00 AM - Thursday, May 6, 2021 12:00 AM

Phase 6

Lane-By-Lane Count



# More Than the Intersection

**Corridor-based Visualization** 







Focusing the traffic engineer on issues; expanding the reach of a single engineer.

14

### Corridor to Intersection

Identifying outliers and issues enable an engineer to focus on problematic intersections that need the most attention.



### Watchdog Report Aggregation

Daily watchdog report looks for trends that indicate equipment failures.

Trends over time can identify common failures or performance issues.

e Range:	Alert:	Phase:	Intersection Filter:	Streak:	
04/26/21 - 05/10/21	Bad Ped Pushbuttons 🔹	All 🔫		All	





Use the 'Intersection Filter' box to reduce the size of the list. Filter on the intersection name or ID number.

		Apr 27		Apr 29		May 01		May 03
88: Edgewood Ave @ Fort St/I-75/I-85 N Ramp	det 4							
149: Capitol Ave SE @ Capitol Sq SW	det 2				-			
165: Capitol Ave SE @ GA154 MP: 34.04	det 4							
165: State Route 154/Memorial Dr @ Capitol Ave	det 4		1 i					
176: West Peachtree St @ 3rd St NE	det 4							
191: 17th St @ West Peachtree St	det 4	and the second						
191: West Peachtree St @ 17th St	det 4							
209: West Peachtree St @ 12th St NE	det 4							
215: Juniper St @ 12th St NE	det 4							
216: Juniper St @ 11th St	det 8	and the second			1	A		
236: North Ave @ Techwood Dr	det 4							
245: North Avenue @ Hunt Street	det 4							
245: North Avenue @ Hunt Street	det 6							
279: 10th St NE @ Atlantic Drive	det 4	and the second			5			· · · · · · · · · · · · · · · · · · ·
1461: SR 20 @ Buford Mall	det 4							
1713: State Route 124 @ Oak Rd	det 8							
1724: State Route 10 @ Killian Hill Rd/SR 264/Bethany Church Rd	det 2		100 C					
1724: State Route 10 @ Killian Hill Rd/SR 264/Bethany Church Rd	det 4							
1724: State Route 10 @ Killian Hill Rd/SR 264/Bethany Church Rd I	det 6							
1724: State Route 10 @ Killian Hill Rd/SR 264/Bethany Church Rd I	det 8		the second s					
1848: Bush Rd @ Medlock Bridge Rd	det 2							
1848: Bush Rd @ Medlock Bridge Rd	det 4							
1848: Bush Rd @ Medlock Bridge Rd	det 6	and the second						
1848: Bush Rd @ Medlock Bridge Rd	det 8					·		
1931: SR 141 @ Engineering Dr	det 8							
7007: State Route 42 @ Glenwood Ave	det 4							
7007: State Route 42 @ Glenwood Ave	det 8							
7086: SR 9/Roswell Rd @ Powers Ferry Rd	det 4							
7086: SR 9/Roswell Rd @ Powers Ferry Rd	det 8							
7154: SR 138 / SR 20 @ Old Salem Rd SE	det 2							· · · · · · · · · · · · · · · · · · ·
7154: SR 138 / SR 20 @ Old Salem Rd SE	det 4							
7164: SR 3/Metropolitan Pkwy SW @ Atlanta Metropolitan College	det 6							
7167: SR 3/Metropolitan Pkwy SW @ Fair Dr SW	det 2							
7168: SR 3/Metropolitan Pkwy SW @ Deckner Ave SW	det 8				1. C			1
7178: SR 3/Northside Drive @ Tatnall St SW I	det 4							
7184: SR 3/Metropolitan Pkwy SW @ Ralph David Abernathy I	det 2							
7184: SR 3/Metropolitan Pkwy SW @ Ralph David Abernathy I	det 4							
7184: SR 3/Metropolitan Pkwy SW @ Ralph David Abernathy I	det 6							
7184: SR 3/Metropolitan Pkwy SW @ Ralph David Abernathy	det 8	and the second			1			
7284: SR 9/Alpharetta Hwy @ Cumming St I	det 6							
7336: SR 6/Camp Creek Pkwy @ N Commerce Dr	det 2						and the second se	and the second
360: SR 155 / Flat Shoals Pkwy @ Clifton Springs Rd / Columbia Dr	det 2							
360: SR 155 / Flat Shoals Pkwy @ Clifton Springs Rd / Columbia Dr	det 4							
360: SR 155 / Flat Shoals Pkwy @ Clifton Springs Rd / Columbia Dr	det 6							
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	Signal	Corridor	value	Acworth	Alp"ale"	Suwapee	Jackson Molberry	Topo
1	1725: State Route 10 @ Oakland Park Blvd/Veracrus Dr	SR 10-Gwinnett	78,286.0	Kennes aw	Roswell	Duluth	Auburn Vehicles	Per Day
	7073: SR 141/Peachtree Rd @ Church Crossing	SR 141S	76,051.0	Cobb Washing	B15:n Marie 1	Lawrenceville	20,0'	00 - 40,000
1	7399: State Route 6 (Thornton Rd) @ N Blairs Bridge Rd	SR 6	75,763.0	Dallas	Sandy Springs	NUCLOSS 4	60,0	00 – 80,000
	1630: SR 20 @ Sudderth Rd	SR 20	73,784.0	Powder	myrna	Liburn	Wallon .	
P.	7397: State Route $\delta$ (Thornton Rd) @ West Corporate Ct/Waterway Cir	SR 6	72,795.0	M Startings	sleton	Turke speliville 20	anville	
	1629: SR 20 @ S Bogan Rd / Anitox Dr	SR 20	72,029.0	er Oleelt	-5 21 2	Stone Mountain Park	N* roe	acka Creek
Chinal	7549: SR 8 /Scott Blvd @ Orion Dr	SR 8W-DeKalb	69,743.0	Douglasville		R eda	D. A. LONG	B
	1724: State Route 10 @ Killian Hill Rd/SR 264/Bethany Church Rd	SR 10-Gwinnett	69,702.0			free go to any the		Sandy Cre
1	1635: SR 20 @ Satellite Blvd	SR 20	69,662.0	STALL FOR	E t Poigi Sour Riv	Covyers	Social Cirde	Hard Labor
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### Map-based visualization

#### Special Events Area Performance Measures



**Real-time Visualization** 

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### SigOps Metro2 Quarterly Report

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### OTHER CORRIDOR DATA FY 2021 Q3 | Page 3

### SigOps Metro2 Quarterly Report



#### SigOps Metro2 Quarterly Report FY 2021 Q3 | Page 4 **EQUIPMENT UPTIME** 2021 Q3 Current Quarter % Change Program Trends Metric Goal 84.2% 83.5% **CCTV** Availability 84.2% 0.8% 81.2% 95% 78.4 79.5% 97.1% 95.6% 92.7% 92.5% Vehicle Detector Availability 97.1% 95% 1.6% 87.8% 96.8% Ped Pushbutton Availability 96.8% 95% 4.1% 93.0% 92.9% 92.3% 91.1% 99.1% 98.2% **Communications Uptime** 95% 99.1% 0.9% 97.1% 97.1% 96.8% 2020 Q3 2020 Q4 2021 Q1 2021 Q2 2021 Q3 **Executive Reports** 21
# Thank You!

Follow the Georgia Department of Transportation

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- June 21-24: TRB Conference on Transportation Planning Applications
- August 10-12: National Conference on Transportation Asset Management

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