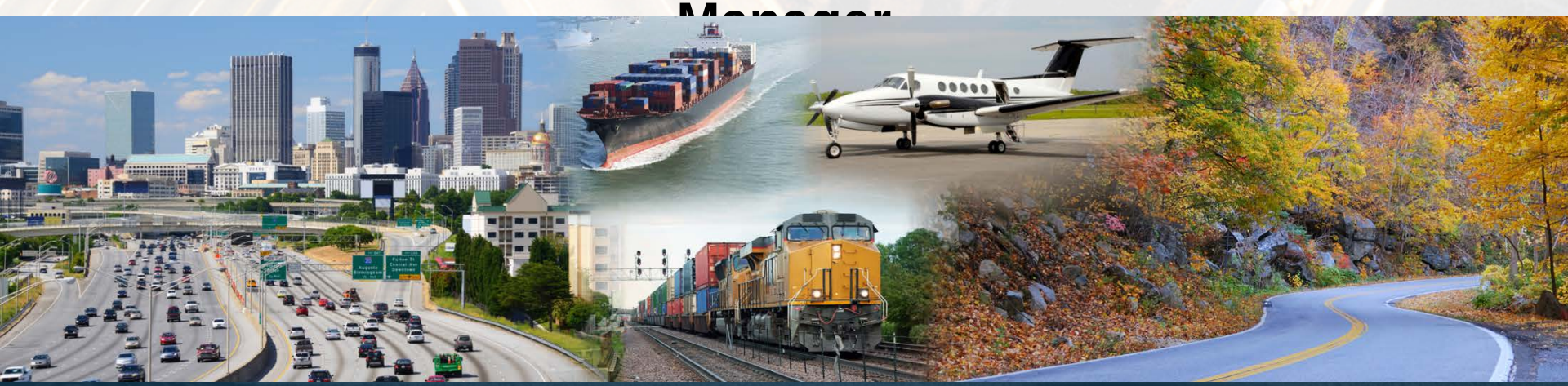
Regional Traffic Operations Program

Approach to Measure of Effectiveness

Shahram Malek, PhD, PE

Regional Traffic Operations Project Manager



Georgia Department of Transportation

ARCADIS

RTOP

- Regional Traffic Operations Program
- Regionally significant traffic signal corridors in Atlanta
- 2010: 430 signals
- 2016: Over 1,100 signals

RTOP Teams Supporting GDOT

ARCADIS

RTOP 1 (600+ signals)

Kimley»Horn

RTOP 2 (500+ signals)

Chester Thomas, PE PTOE

RTOP GDOT Manager

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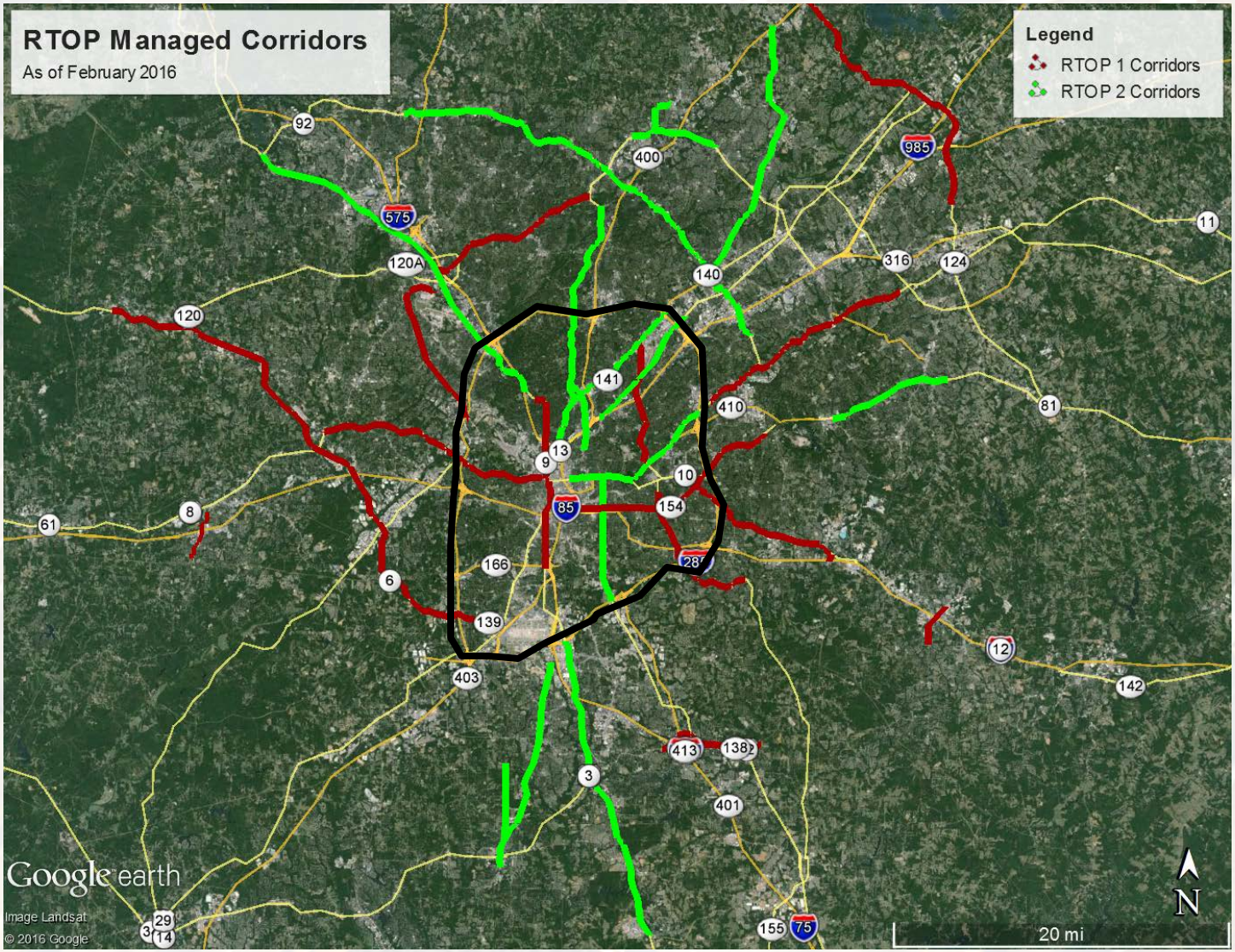
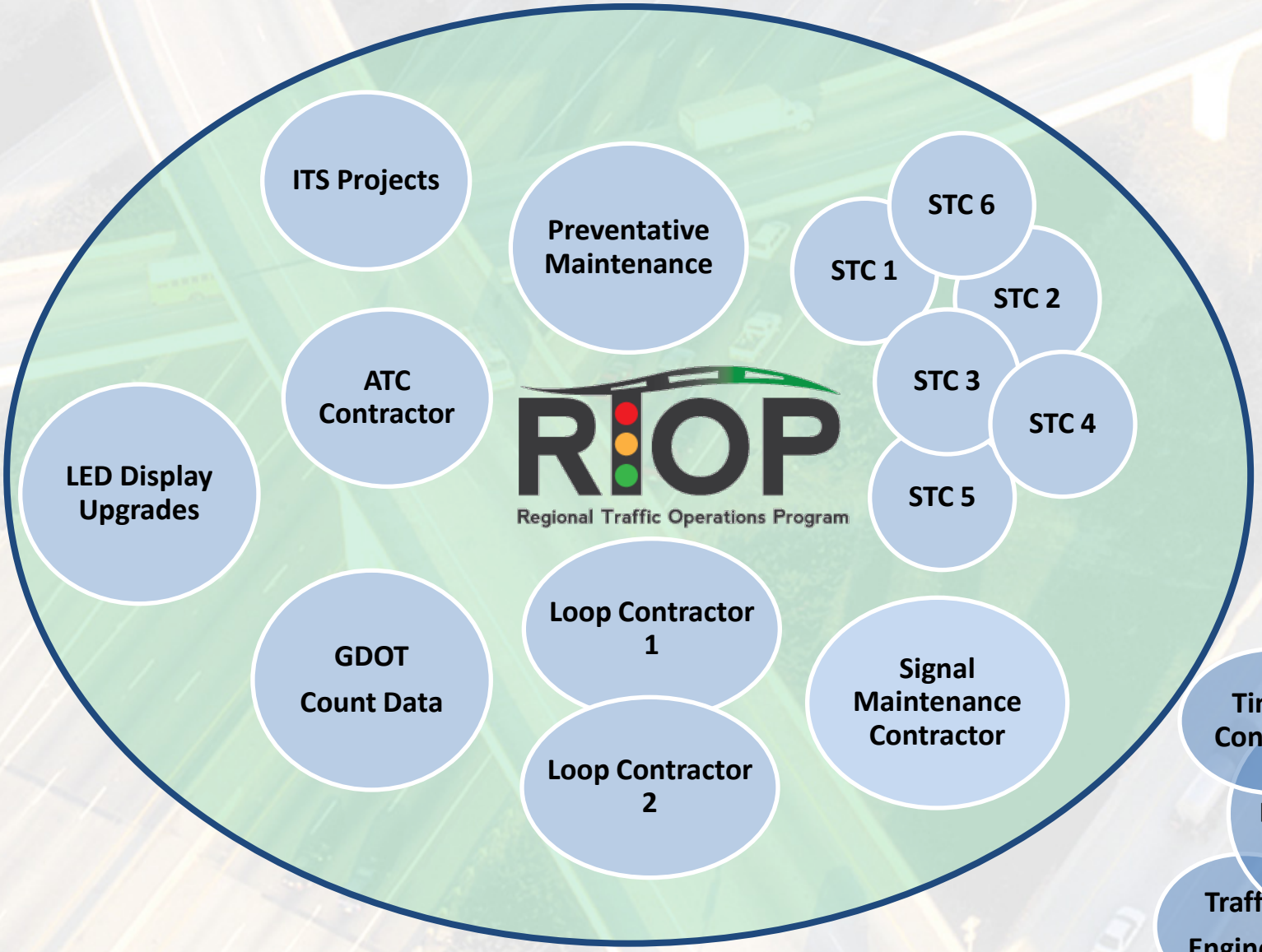
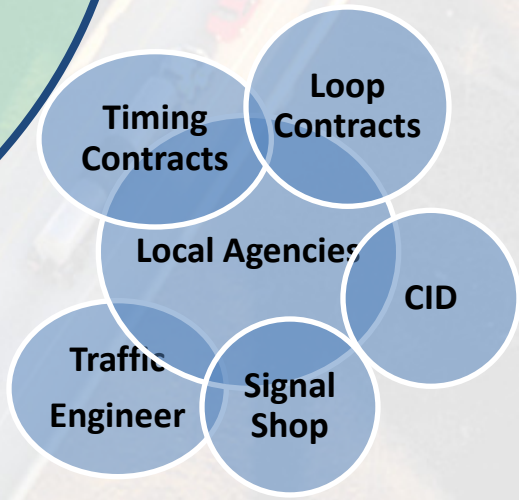
Regionally Significant Corridors



I-285 ("The Perimeter") shown with a black line

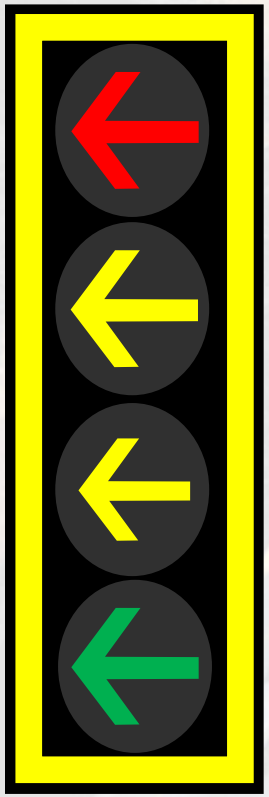

ITS Projects
Preventative Maintenance
STC 6
STC 1
STC 2
STC 3
STC 4
STC 5
ATC Contractor
LED Display Upgrades
RTOP
Regional Traffic Operations Program
GDOT Count Data
Loop Contractor 1
Loop Contractor 2
Signal Maintenance Contractor


Timing Contracts
Loop Contracts
Local Agencies
CID
Traffic Engineer
Signal Shop

RTOP Mission: To increase travel reliability by minimizing congestion and reducing delays along regional commuter corridors through improved signal operations.

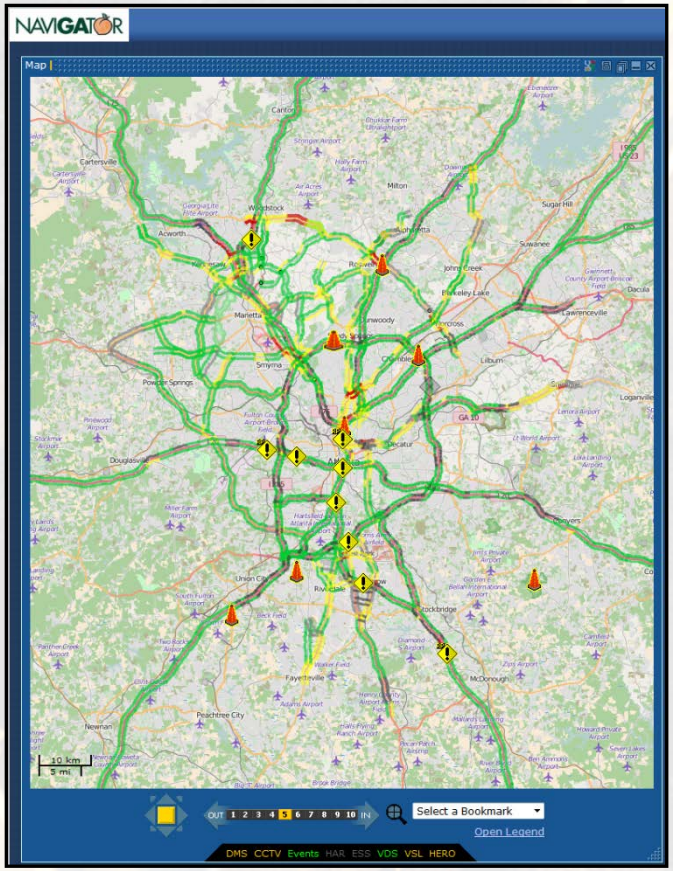
Firsts

- Shared Communication Network – RNET
- Program Based Technology Evaluation
- Cloud Based Traffic Signal System – Citrix
- Successful TR operation in GA – Across Jurisdiction Boundaries
- Video Sharing Architecture
- Ethernet over Copper
- Wireless Ethernet
- IP-based CCTV
- Retroreflective Backplates
- Deployments of Flashing Yellow Arrow
- Deployment of regional travel time detection system



RTOP Primary Tasks

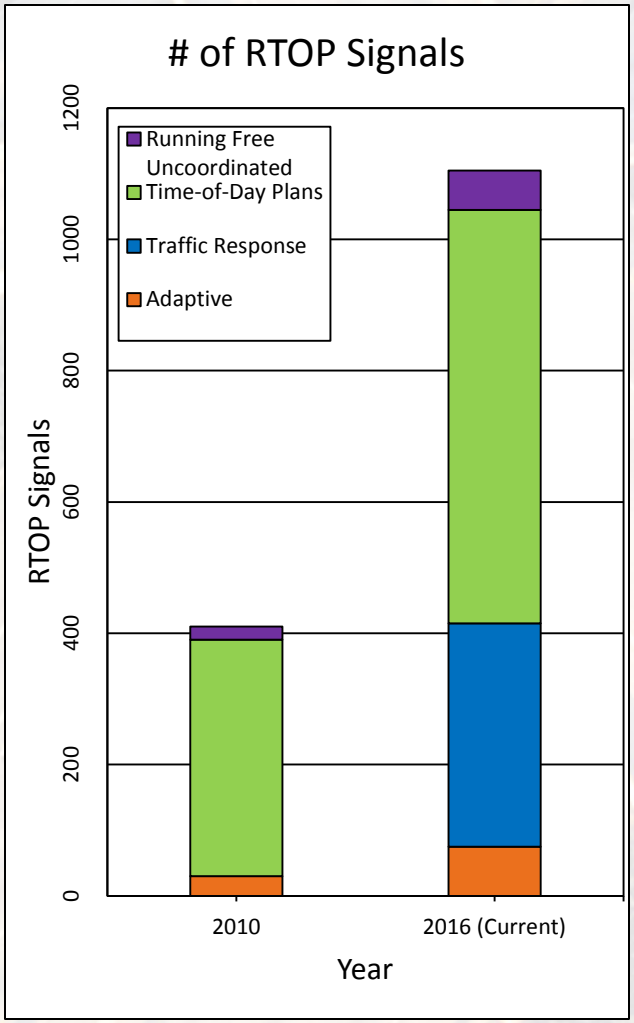
- Active corridor management (incidents)
- Traffic signal timings
- Traffic signal maintenance
- Traffic signal infrastructure

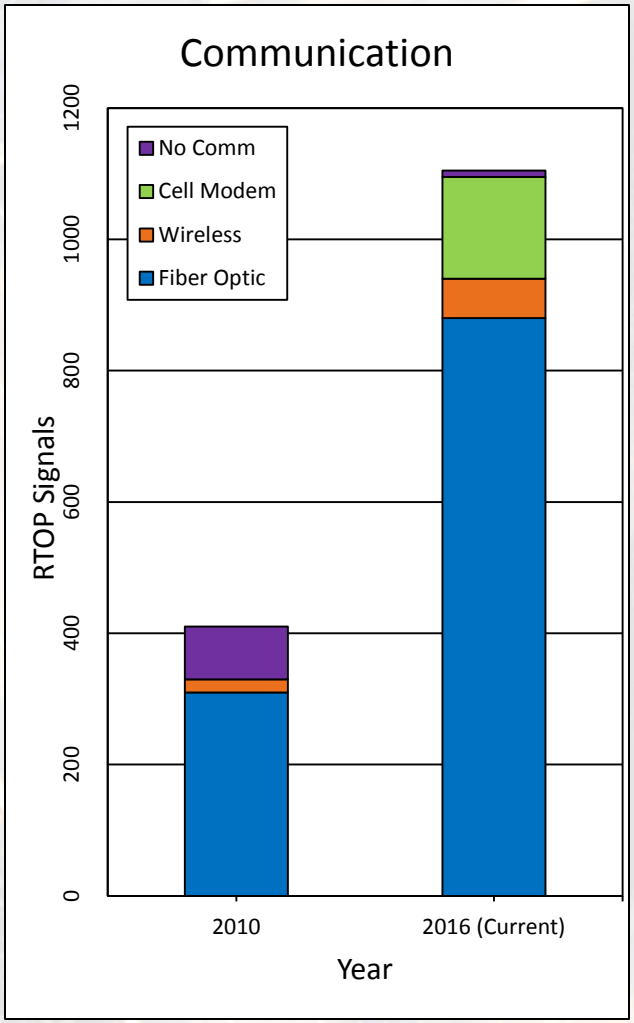


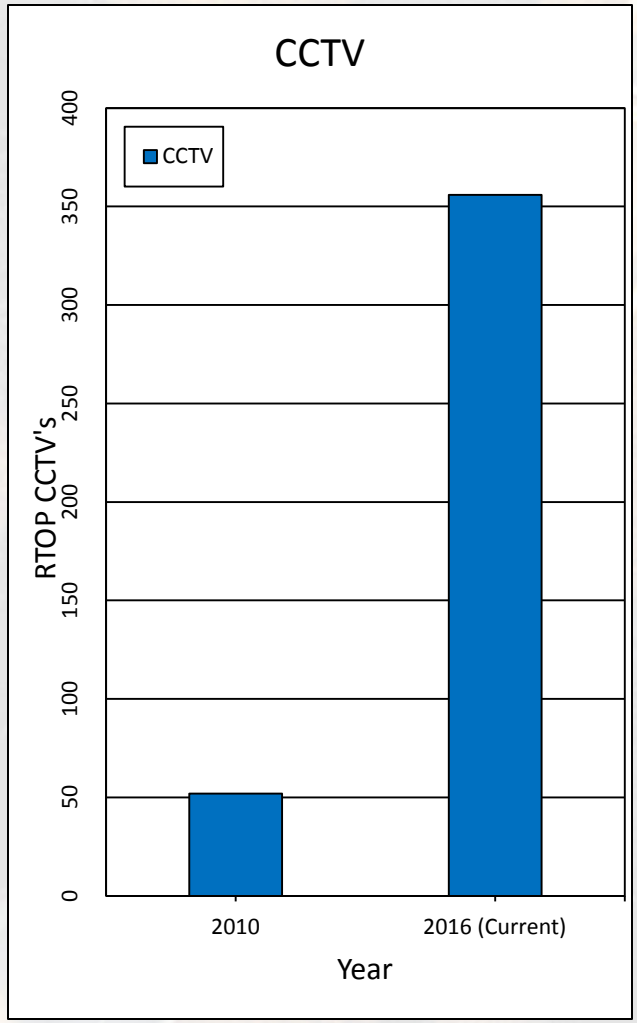
RTOP Staff

- GDOT management
- Corridor managers
- Traffic signal technicians
- TMC operators
- Traffic signal contractors

Traffic Signal Operation Changes







Performance Measure: Now & Future

- Performance influences
- Initial performance measures (2010)
- Current performance measures
- Future performance measures

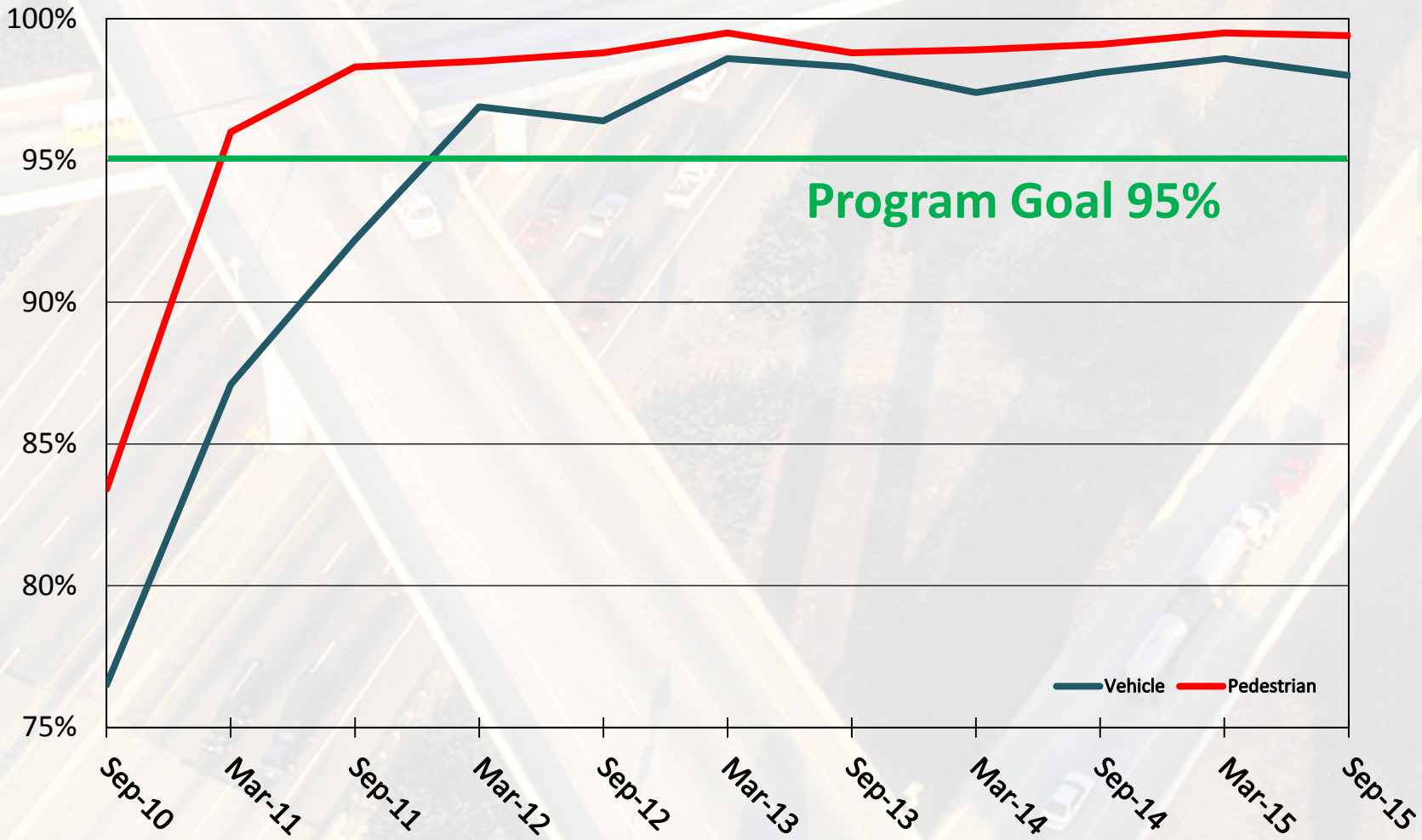
Performance Influences

- Economic changes
- Road construction impacts
- Road/intersection improvements
- Shifting traffic patterns
- Price of fuel

Initial Performance Measures (2010)

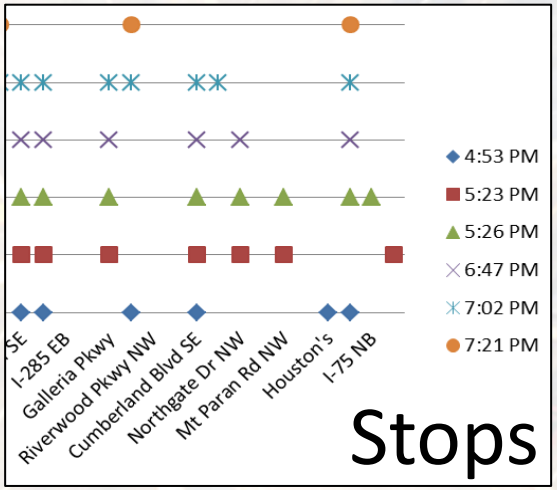
- Detection performance
- Travel time runs
- Traffic volumes
- Time & fuel benefit
- Malfunction identification source

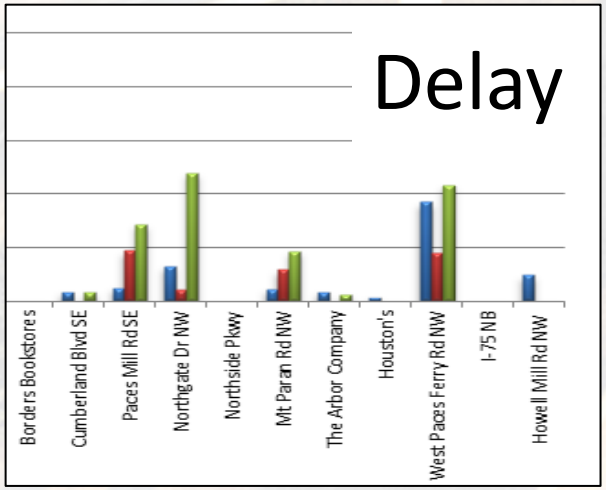
Vehicle & Pedestrian Detection Performance

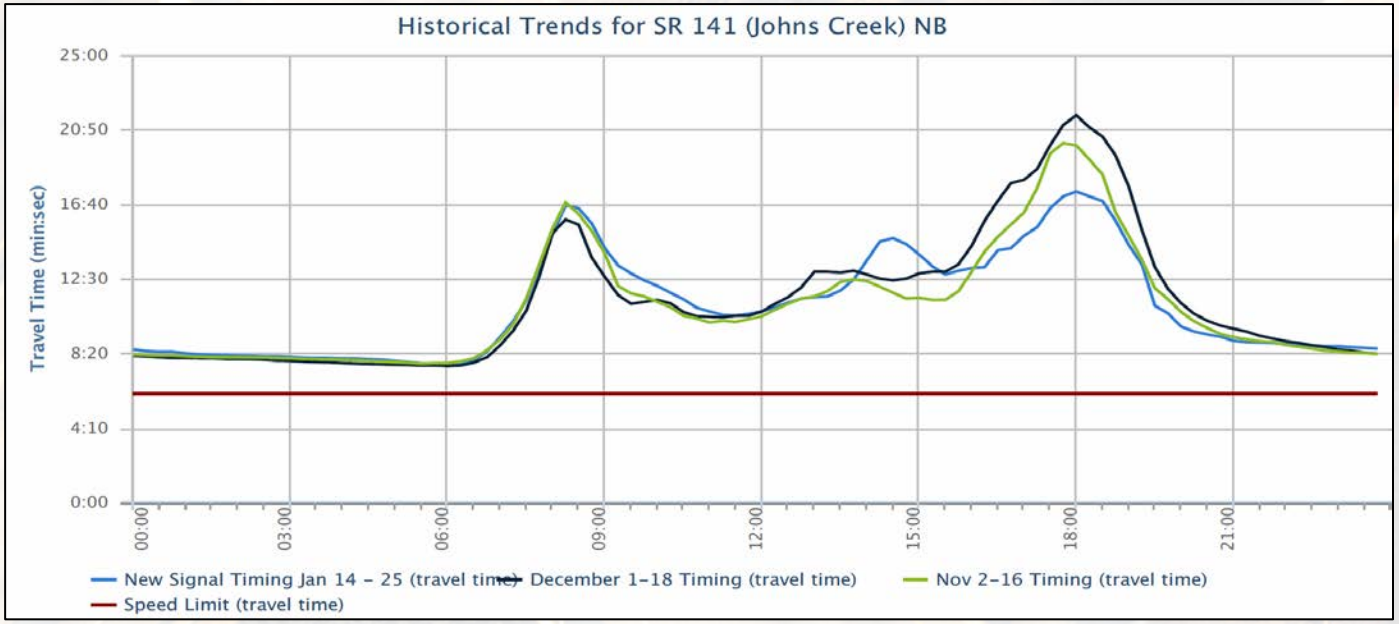


RTOP 1 Results

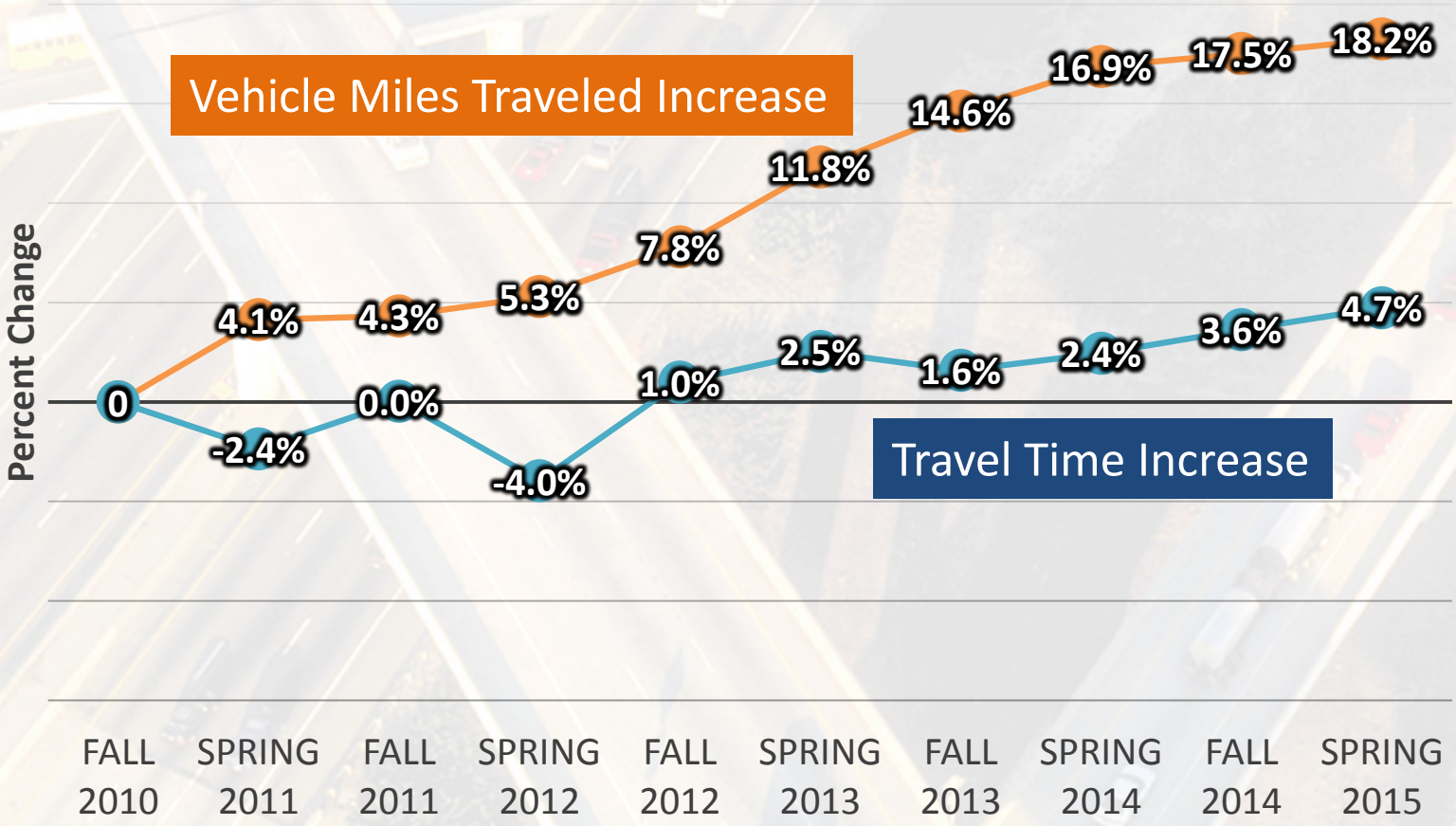
Travel Time Runs





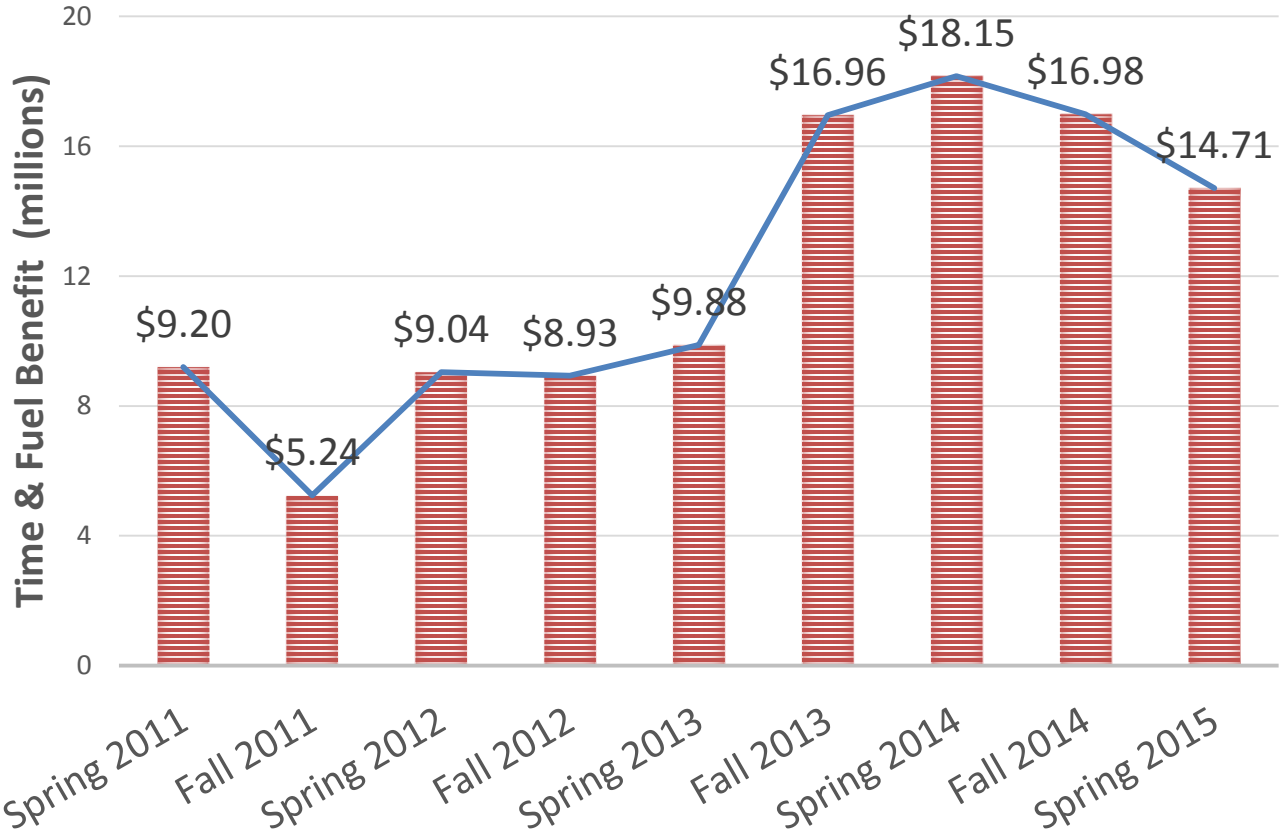


Traffic Volumes



RTOP 1 Results

Time & Fuel Benefit



RTOP 1 Results

Malfunction Identification Source

PROACTIVE IDENTIFICATION OF EVENTS

Actively Managed Corridors		Percentage (%)	Total Reported by Local Agency	Total Found by CM
SR 3 - Cobb/ N'side	Oct 2015	93.5%	4	58
	Nov 2015	91.0%	6	61
	Dec 2015	76.7%	14	46
SR 3 - Tara/Old Dixie	Oct 2015	95.7%	8	177
	Nov 2015	94.8%	5	92
	Dec 2015	98.9%	1	93
SR 8 - DeKalb/ L'ville	Oct 2015	100.0%	0	29
	Nov 2015	96.6%	1	28
	Dec 2015	100.0%	0	32
SR 8 - Fulton/ PDL	Oct 2015	100.0%	0	15
	Nov 2015	100.0%	0	28
	Dec 2015	100.0%	0	10
SR 9 - Buckhead	Oct 2015	100.0%	0	7
	Nov 2015	100.0%	0	44
	Dec 2015	99.1%	4	430
SR 9 - Roswell Rd	Oct 2015	91.5%	10	107
	Nov 2015	87.9%	8	58
	Dec 2015	85.5%	12	71
SR 10 - Gwinnett/ Stone Mtn	Oct 2015	100.0%	0	23
	Nov 2015	100.0%	0	25
	Dec 2015	100.0%	0	22
SR 42 - Moreland Ave	Oct 2015	100.0%	0	37
	Nov 2015	100.0%	0	48
	Dec 2015	100.0%	0	35
SR 85 - Clayton/ Fayette Co	Oct 2015	71.4%	10	25
	Nov 2015	92.9%	6	78
	Dec 2015	86.6%	17	110
SR 92 - Cherokee/ Cobb	Nov 2015	93.6%	3	44
	Dec 2015	68.8%	5	11
SR 140/92 - Roswell	Nov 2015	96.4%	2	53
	Dec 2015	97.3%	2	73
SR 140 - Gwinnett Co	Nov 2015	89.0%	9	73
	Dec 2015	89.9%	8	71
SR 141 - Peachtree	Oct 2015	97.7%	1	42
	Nov 2015	100.0%	0	75
	Dec 2015	100.0%	0	75
SR 141 - Peachtree/ Medlock	Oct 2015	81.3%	12	52
	Nov 2015	81.3%	14	61
	Dec 2015	95.1%	5	98
SR 237 - Piedmont Rd	Oct 2015	100.0%	0	3
	Nov 2015	100.0%	0	9
	Dec 2015	98.4%	10	600

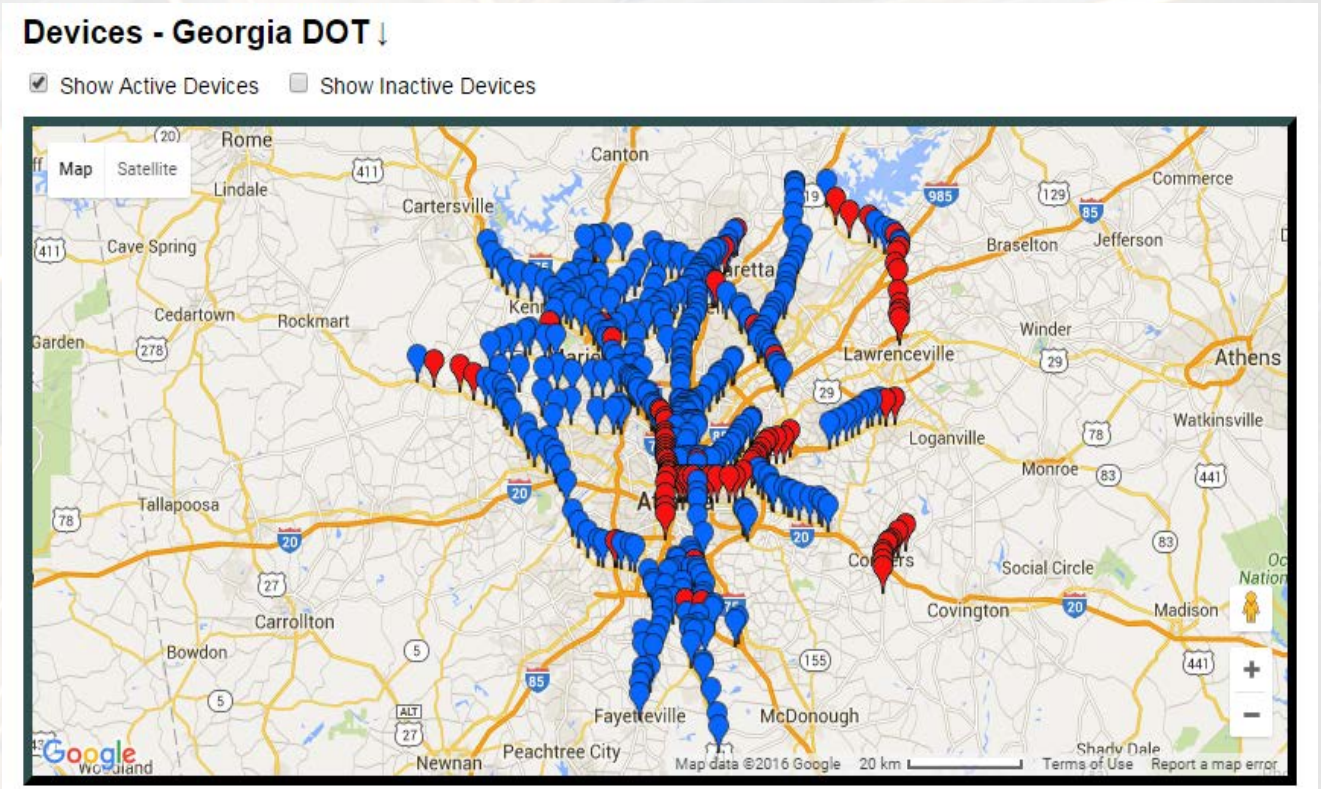
The RTOP team is actively monitoring every corridor in order to identify and resolve malfunctioning equipment and signal timing issues. The Proactive Identification of Events table compares the number of malfunctions, roadway incidents, and operational issues reported by local agencies versus the RTOP team. The RTOP goal is to have 70.0% of events reported by the RTOP team.

RTOP1 Results

Current Performance Measures

- Travel time system
- Traffic signal asset tracking
- Automated monthly report spreadsheet

Travel Time System



SENSYS networks

BlueTOAD by TRAFFICAST

Acyclica

WAVETRONIX

Georgia Department of Transportation

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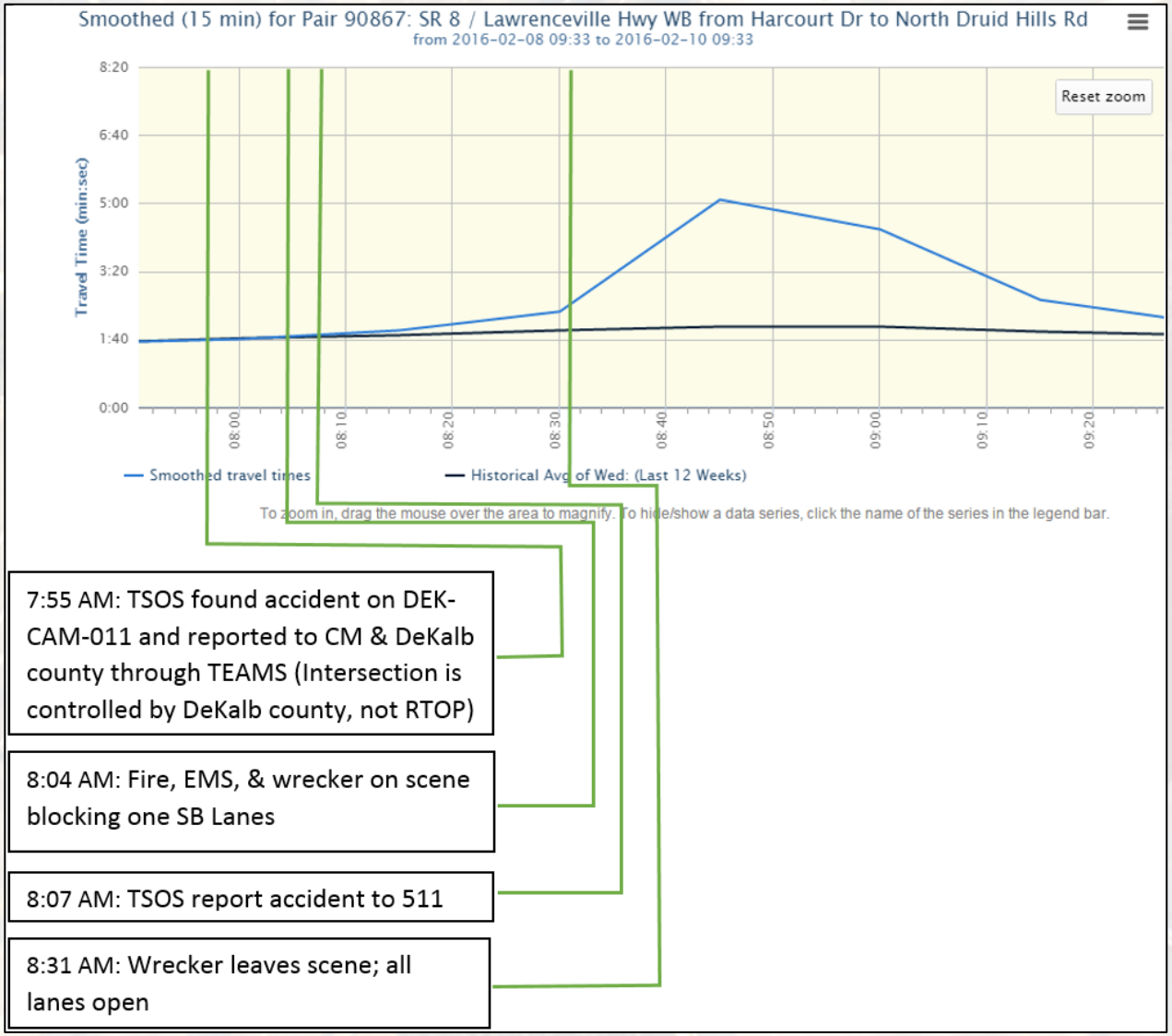
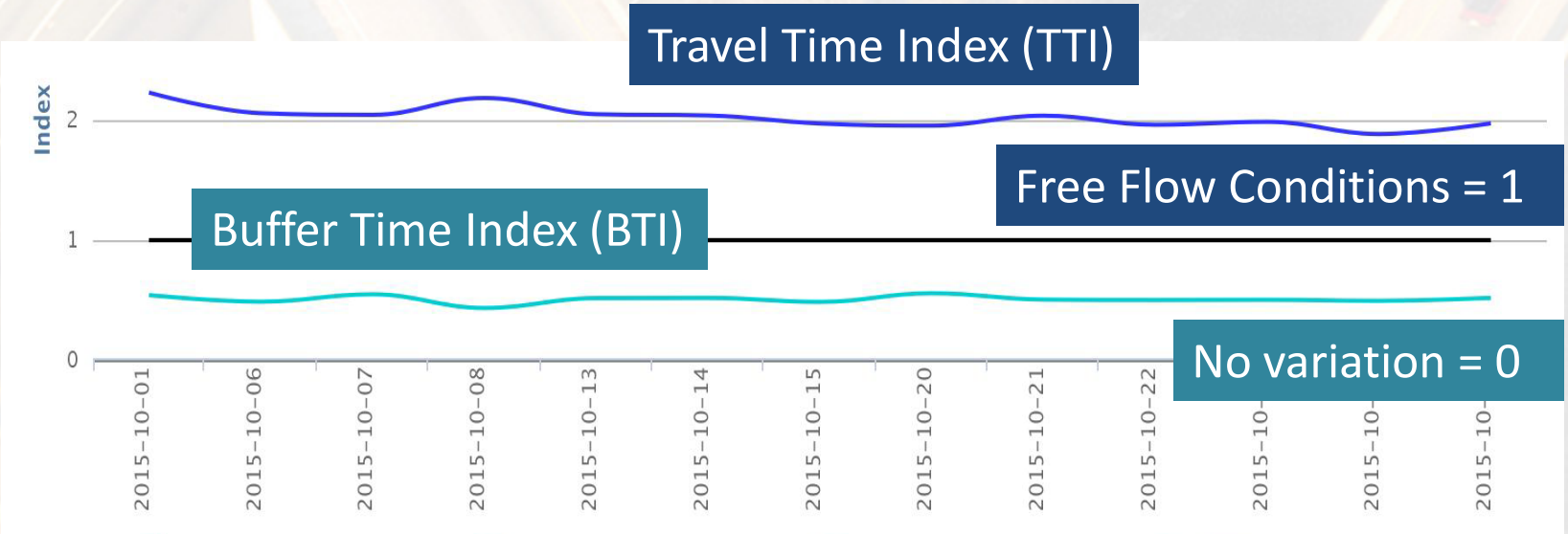
Major Incident Example



- Date:
  02/10/2016
- Location:
  N Druid Hills Road
- Direction:
  Southbound
- Incident Clear Time:
  Approx. 30 mins.

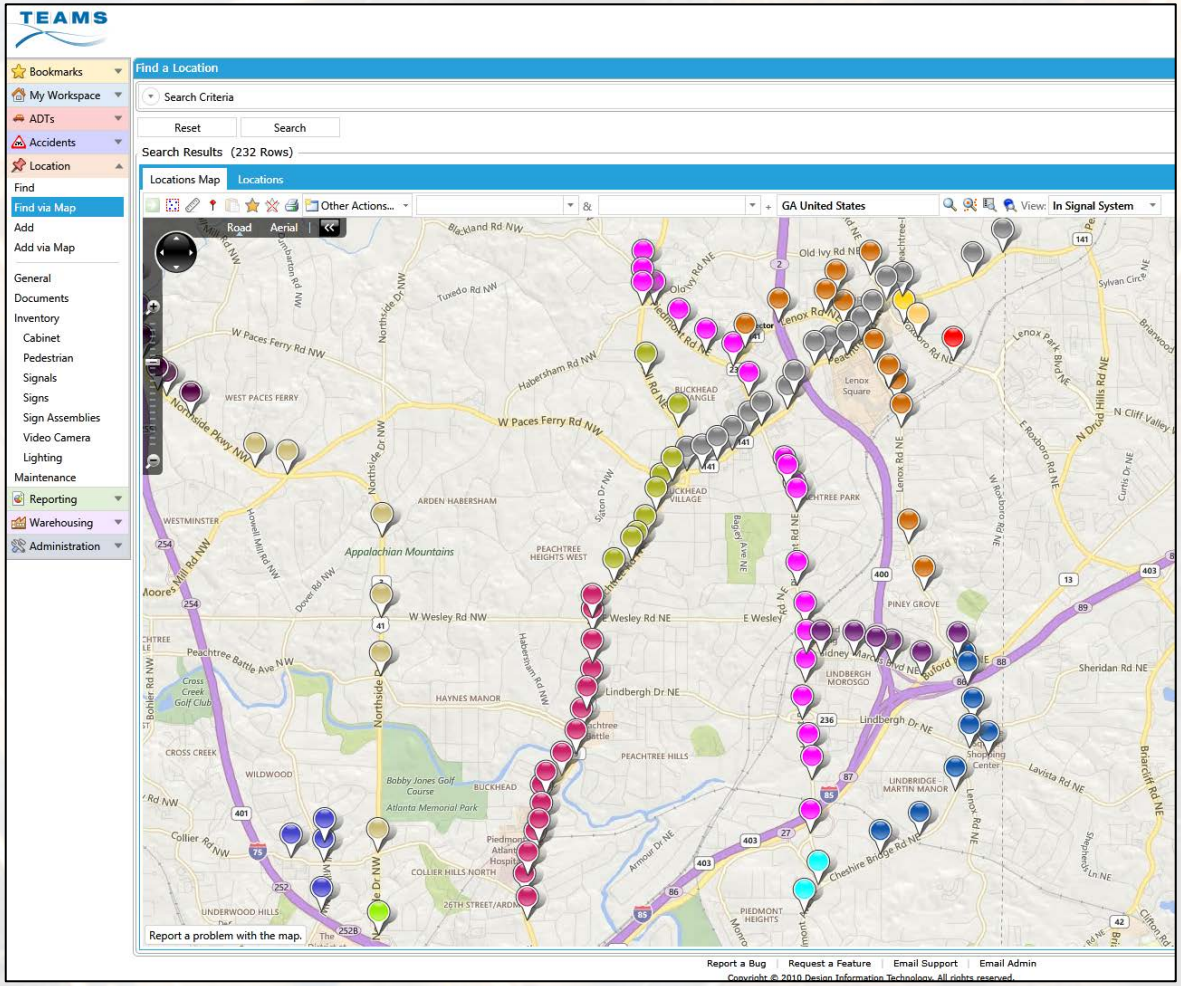
Travel Times

- Time periods of interest
  - Morning peak period: 4 hours (6 – 10 AM)
  - Mid-day: 5 hours (10 AM – 3 PM)
  - Afternoon peak period: 4 hours (3 – 7 PM)
- Reliability



Traffic Signal Asset Tracking

- Asset Management
- Malfunctions
- Incidents
- Operational
- Preventative Maintenance
- Reporting
- Accident Management



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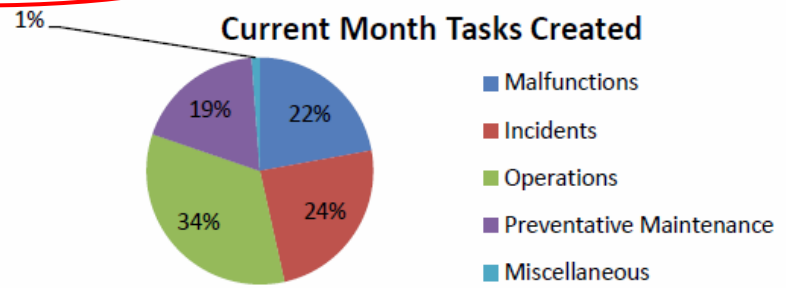
Automated Monthly Report

Traffic Signal Task Status

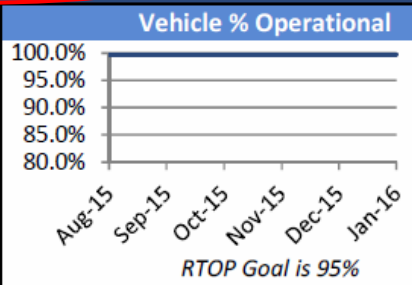
Report Ver. 2.0

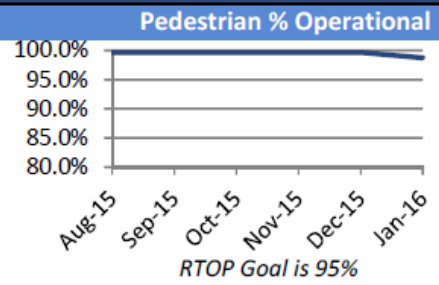
	Created			
Task Type	Oct-15	Nov-15	Dec-15	Jan-16
Malfunctions	20	8	10	19
Incidents	18	6	13	21
Operations	14	9	13	29
Preventative Maintenance	9	46	21	16
Miscellaneous	1	2	3	1
Total - Created Tasks	62	71	60	86
Total - Resolved Tasks	50	67	53	74

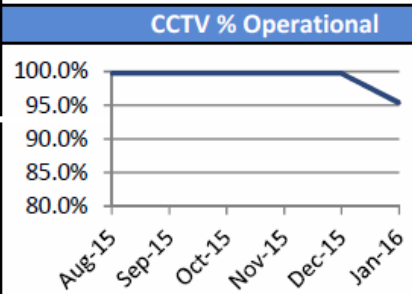


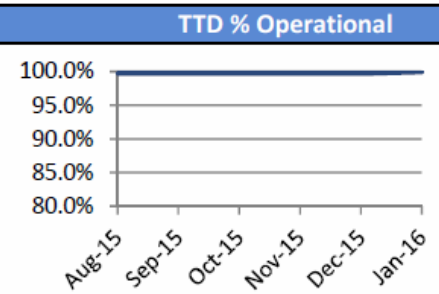
Device Status

Device Status		Nov-15	Dec-15	Jan-16
Vehicle Detection	Operational	724	724	724
	Total	726	726	726
	% Operational	99.7%	99.7%	99.7%
Pedestrian Detection	Operational	394	394	394
	Total	399	399	399
	% Operational	98.7%	98.7%	98.7%
Traffic Cameras (CCTV)	Operational	40	40	41
	Total	43	43	43
	% Operational	93.0%	93.0%	95.3%
Travel Time Detector (TTD)	Operational	31	31	31
	Total	31	31	31
	% Operational	100.0%	100.0%	100.0%









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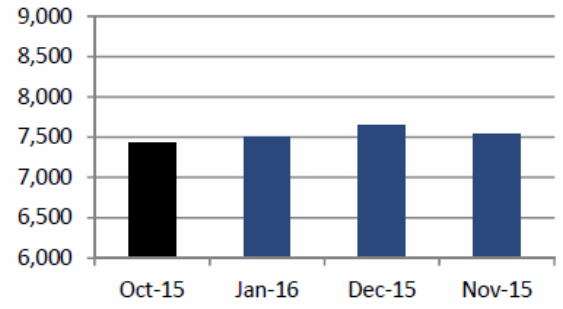
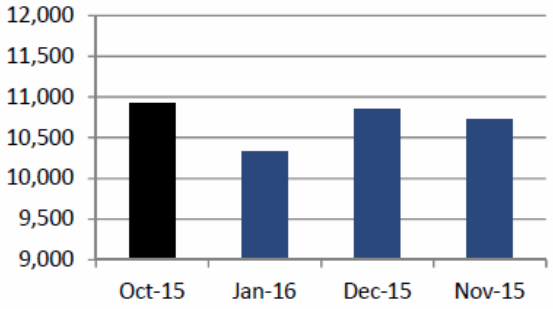
Automated Monthly Report

Average Vehicle Throughput

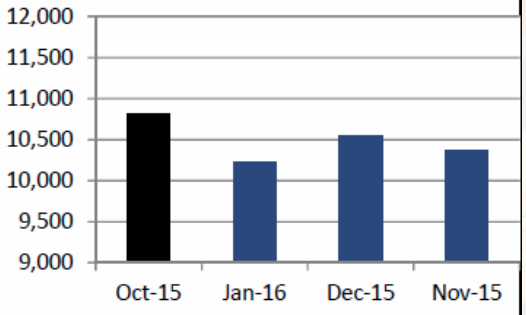
AM Peak (6-10 AM, 4 hours)



Mid-Day (10 AM - 3 PM, 5 hours)



PM Peak (3-7 PM, 4 hours)



Note: The baseline month-year shown (in **bold** below) provides a reference point for traffic volume comparison.

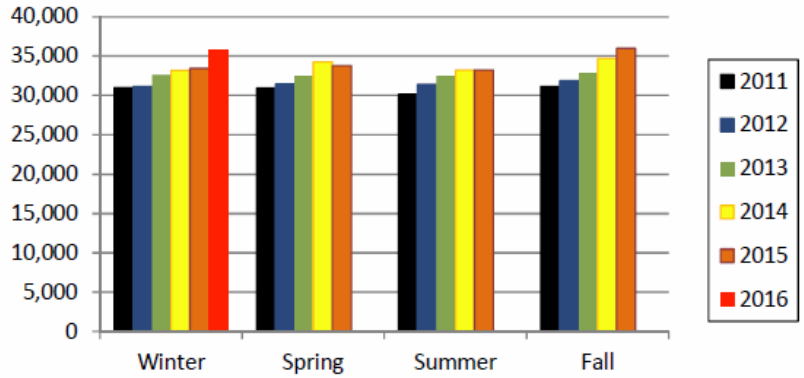
Note: the throughput is based on actual traffic counts at multiple locations, and weighted by pre-determined corridor segment lengths.

AM Peak	Throughput	% Change	Mid-Day	Throughput	% Change	PM Peak	Throughput	% Change
Oct-15	7,430	--	**Oct-15**	10,920	--	**Oct-15**	10,816	--
Jan-16	7,503	1.0%	Jan-16	10,322	-5.5%	Jan-16	10,223	-5.5%
Dec-15	7,645	2.9%	Dec-15	10,842	-0.7%	Dec-15	10,546	-2.5%
Nov-15	7,541	1.5%	Nov-15	10,722	-1.8%	Nov-15	10,360	-4.2%

Corridor Assets

Assets	Start of Year	Changed This Year	Total
Total signals under management	**96**	0	**96**
Traffic signal operation	**96**	0	**96**
Running free/uncoordinated	1	0	1
Time-of-Day Control	14	0	14
Traffic Responsive Operation	38	0	38
Adaptive Control	43	0	43
Other control method	0	0	0
Traffic Camera Locations	43	0	43
Travel Time Detector Locations	31	0	31
Flashing Yellow Arrow conversions	12	0	12

24-hour Volumes at: Galleria Pkwy (Cumberland)



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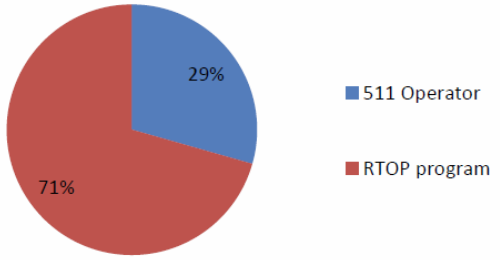
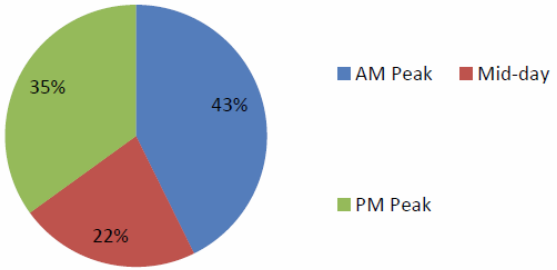
Automated Monthly Report

Event Details - Historical Characteristics

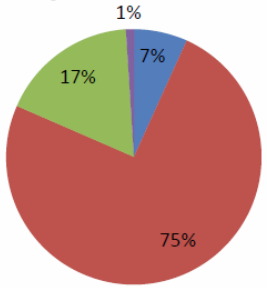
Source



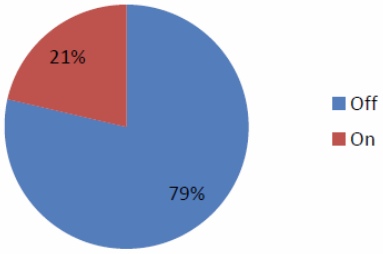
Time Period



Response/Action



On Corridor?



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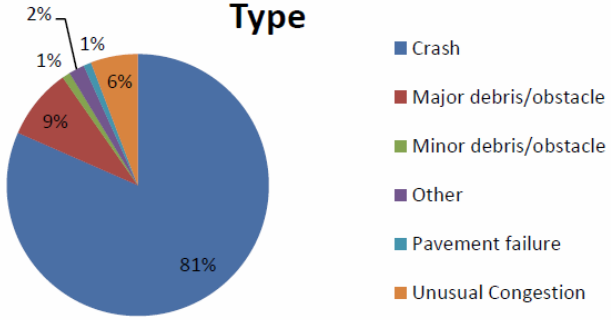
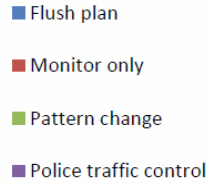


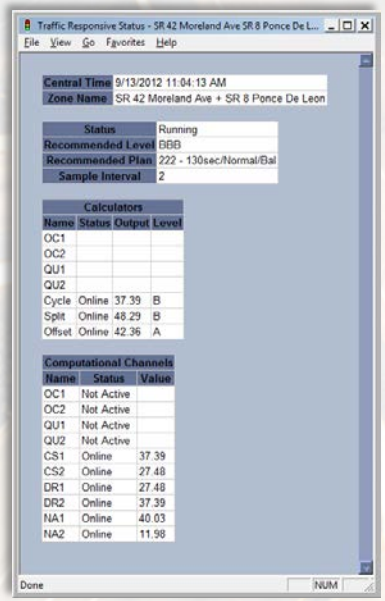


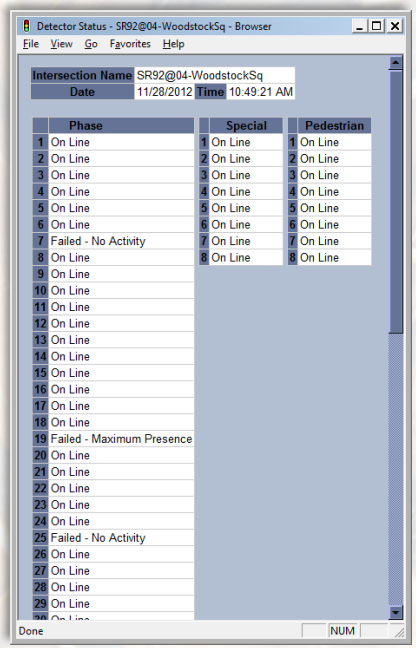
Events are circumstances that affect the RTOP corridor road capacity and/or volumes, which include the possibilty that an intervention by the Corridor Manager may be required. Some events only require monitoring (observations over time), and some events require temporary changes to the traffic signal software to improve throughput during the event.

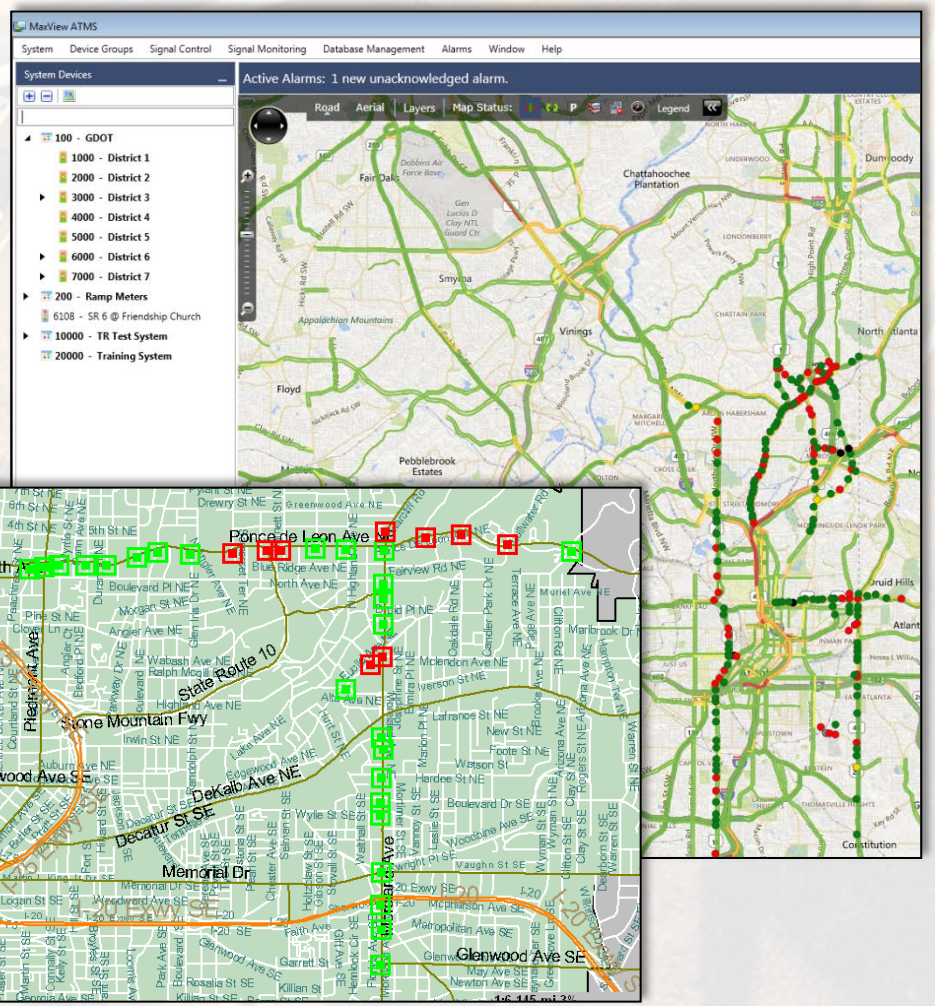
Event Details - Current Month

Date	Event Source	Event on corridor?	Specific Location	Period	Event Type	Response/Action
1/4/2016	511 Operator	Off	I-285 NB @ Cobb Pkwy	PM Peak	Crash	Monitor only
1/5/2016	511 Operator	Off	I-75 @ I-575	AM Peak	Major debris/obstacle	Monitor only
1/5/2016	511 Operator	Off	I-575 @ Barret Pkwy	PM Peak	Crash	Monitor only
1/7/2016	RTOP program	On	SR3 @ Greers Chapel	PM Peak	Crash	Monitor only
1/11/2016	511 Operator	Off	I-75 SB @ Delk	PM Peak	Crash	Monitor only
1/12/2016	511 Operator	Off	I-75 NB @ NMP	PM Peak	Minor debris/obstacle	Monitor only
1/13/2016	511 Operator	Off	I-75 SB @ Cumberland	AM Peak	Crash	Monitor only

Future Performance Measures







- High definition data
- Real-time dashboard
- Improved benefit calculations

Benefit Calculation Opportunities

- 24/7/365 travel time and fuel
- Freeway incident-related benefits
- Safety
- Return on investment on equipment up-time
- Economic growth

Benefits Technical Challenges

- Defining the no-build baseline metrics
- Tracking safety benefits
- Calculating regional impact

Questions?

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