



2026 ITE Western District Annual Meeting

Digital Twin for Optimizing Real Time Traffic Signal Operations

Michael Villafuerte, Director, Software Sales
June 30, 2026

Company Overview

- › Established in 1933
- › Corporate headquarters in Anaheim, with additional offices throughout the U.S., Canada, and Mexico
- › ~900 employees
- › Over 6,000 customers worldwide
- › Deployed technologies include:

150k+
Cabinets
delivered

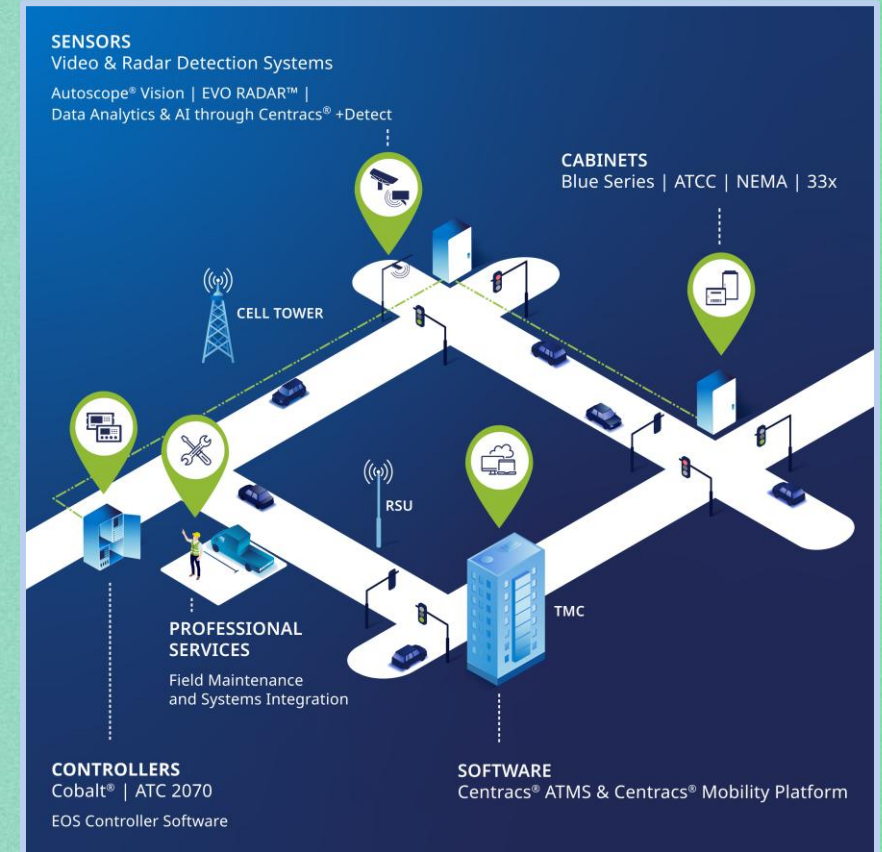
160k+
Sensors
installed

60k+
Managed
intersections

120k+
Traffic
controllers

420+
Systems
deployed

19k+
ITS devices
maintained



Core Technologies & Services

- › Econolite is committed to deploying advanced technologies that reduce travel time, ease congestion, enhance transit operations, provide safer mobility, and improve quality of life.

Cabinets



- › Smart traffic control cabinets in a variety of standard and custom configurations.

Controllers



- › Next generation traffic signal controllers for accurate and reliable traffic management.

Sensors



- › Intelligent traffic sensors for advanced vehicle, bike, and ped detection systems.

Software



- › Cutting-edge software solutions for advanced traffic management.

Modeling & Planning



PTV
Visum



PTV
Vissim



PTV
Viswalk



PTV
Vistro



PTV
Optima



Econolite
Centracs
ATMS



EOS Controller
Software

Software



PTV
Hub



PTV
Model2Go



PTV
Access



PTV
Lines



PTV
Flows



Econolite
Centracs
Mobility

SaaS

Econolite Hardware



Cobalt®
Controllers



2070
Controllers



Autoscope®
Vision



EVO RADAR™



ZincBlue2®



Safetran®
Cabinets



ATC Cabinets

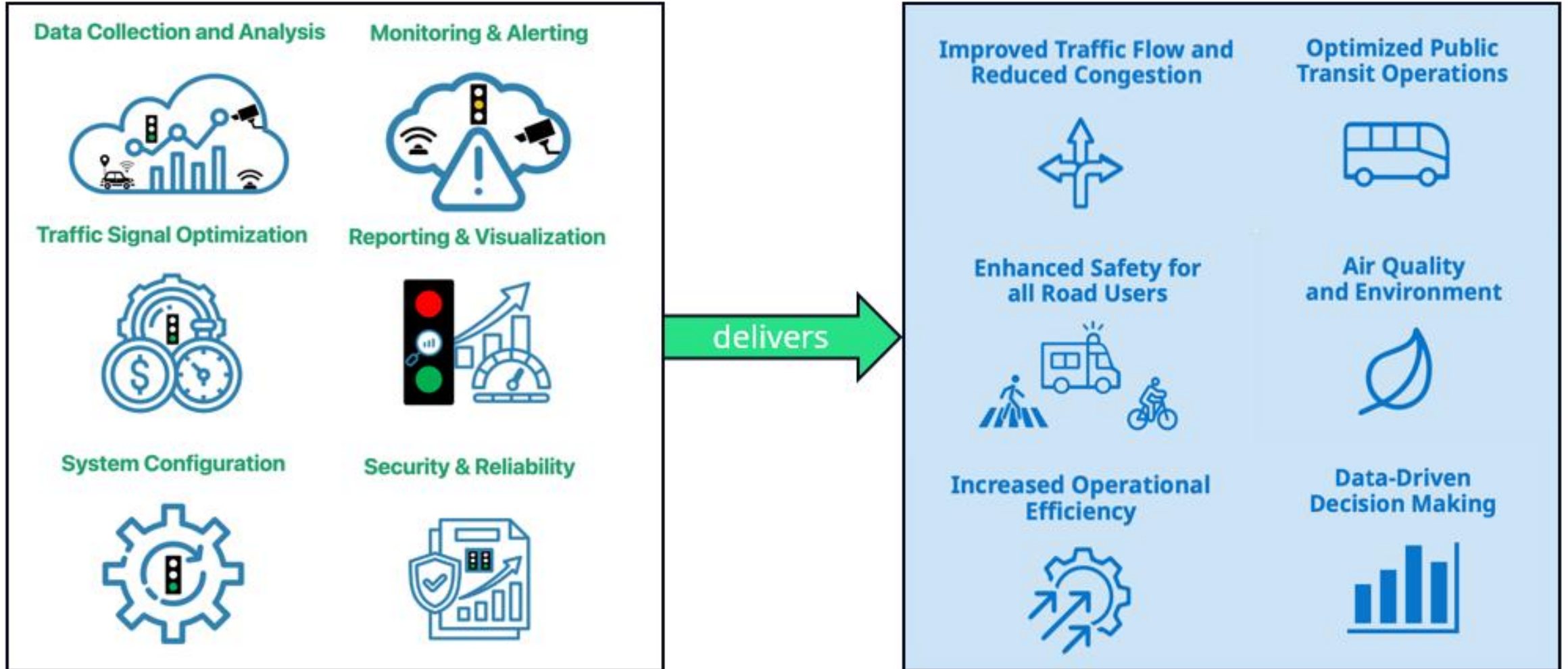


NEMA
Cabinets



Cloud Based ATMS

Centracs Mobility – Cloud ATMS



Cloud Based Traffic Operations

SPM Reports

- › Vehicle delay, arrivals on green/red, split failures, Purdue Coordination Diagram, etc.

Automated Alerts to maintain system

Before/After Analysis

Optimize Signal Timing

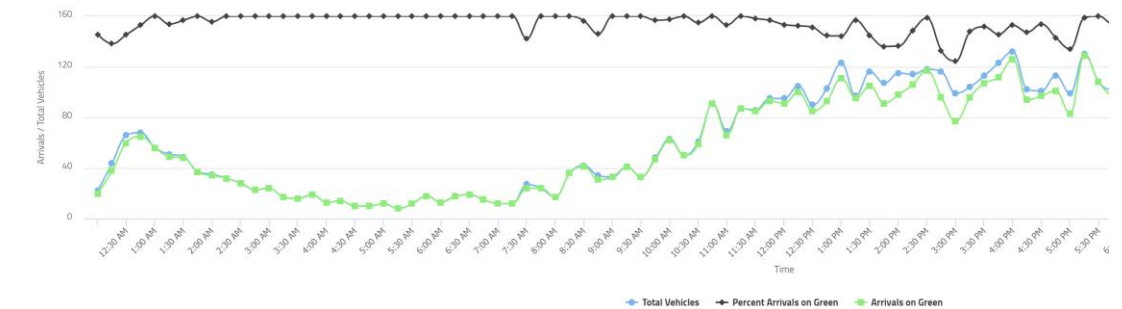
- › Regular fine-tuning

5005 Powers Blvd, Phase: 2, Direction: E

WEDNESDAY, MAY 20, 2020

Total Detector Hits: 5775, Total AoG: 5526, AoG for the selected period: 96%

2(E)

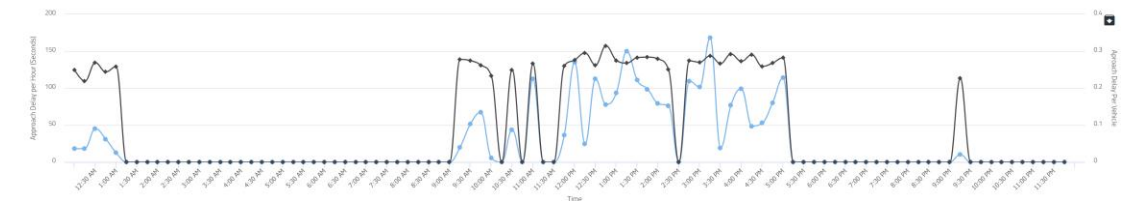


5005 Powers Blvd, Phase: 8, Direction: S

WEDNESDAY, MAY 20, 2020

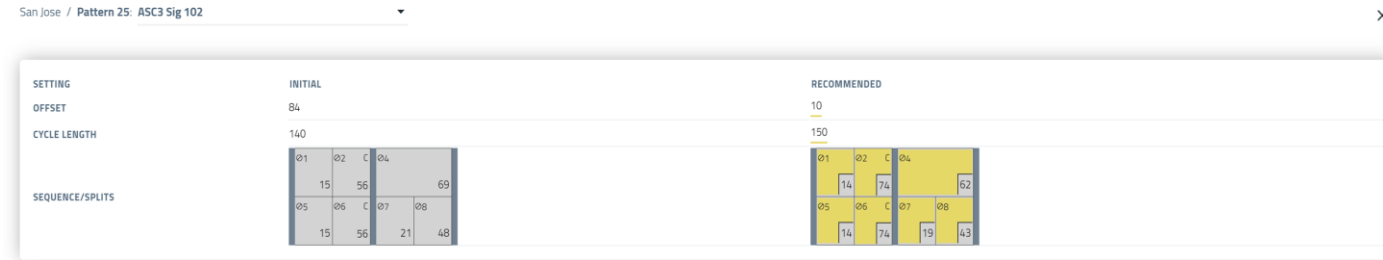
Average Delay Per Vehicle: 0:00:00.26

8(S)



Cloud-Based Traffic Operations

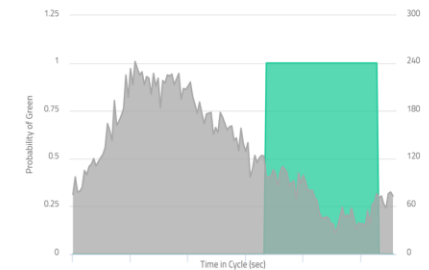
- › ATMS Functions
 - › Real-Time Status and Control
- › Traffic Responsive
 - › Volume or Speed
- › Adaptive
 - › Real-time optimized Cycle, Offset, Split
- › Travel Time and Incident Reports



Probability of Green

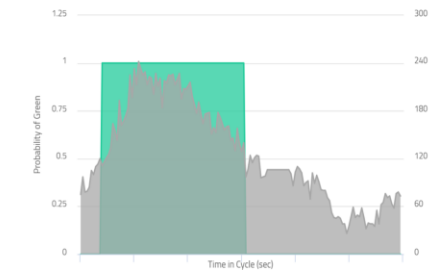
PROGRAMMED GREEN TIME EASTBOUND

INITIAL



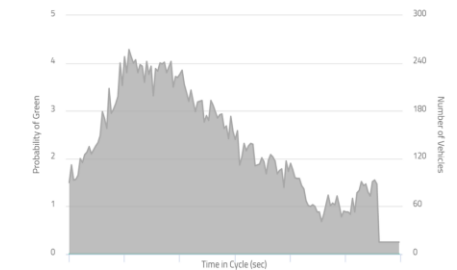
Probability of Green Number of vehicles

PREDICTED

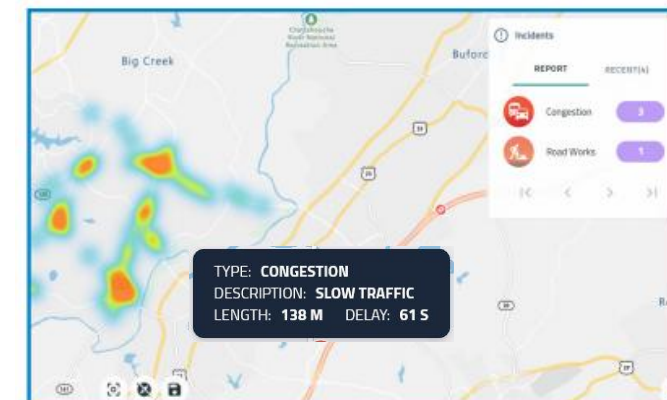


Probability of Green Number of vehicles

OUTCOME

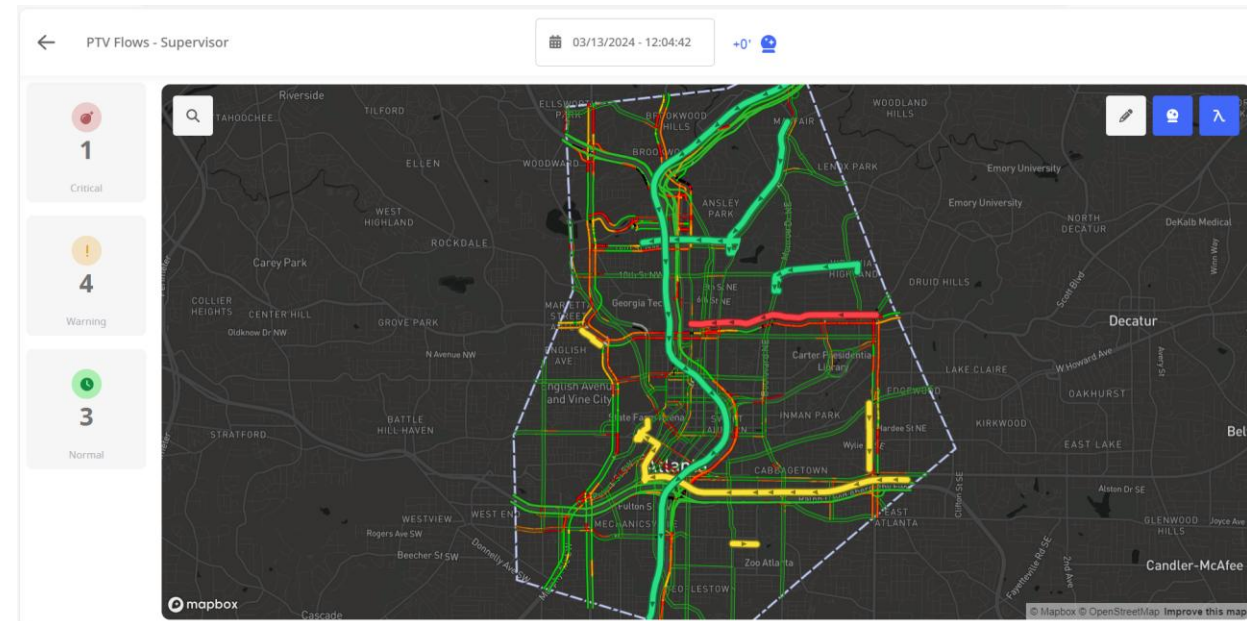


Probability of Green Number of vehicles

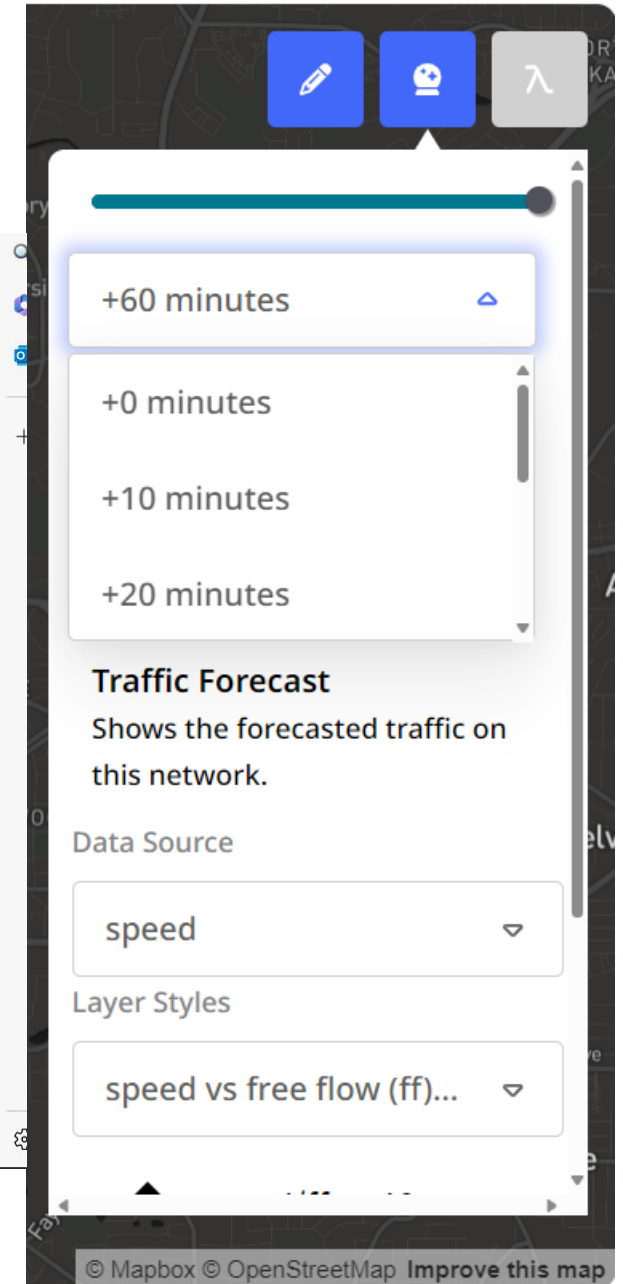
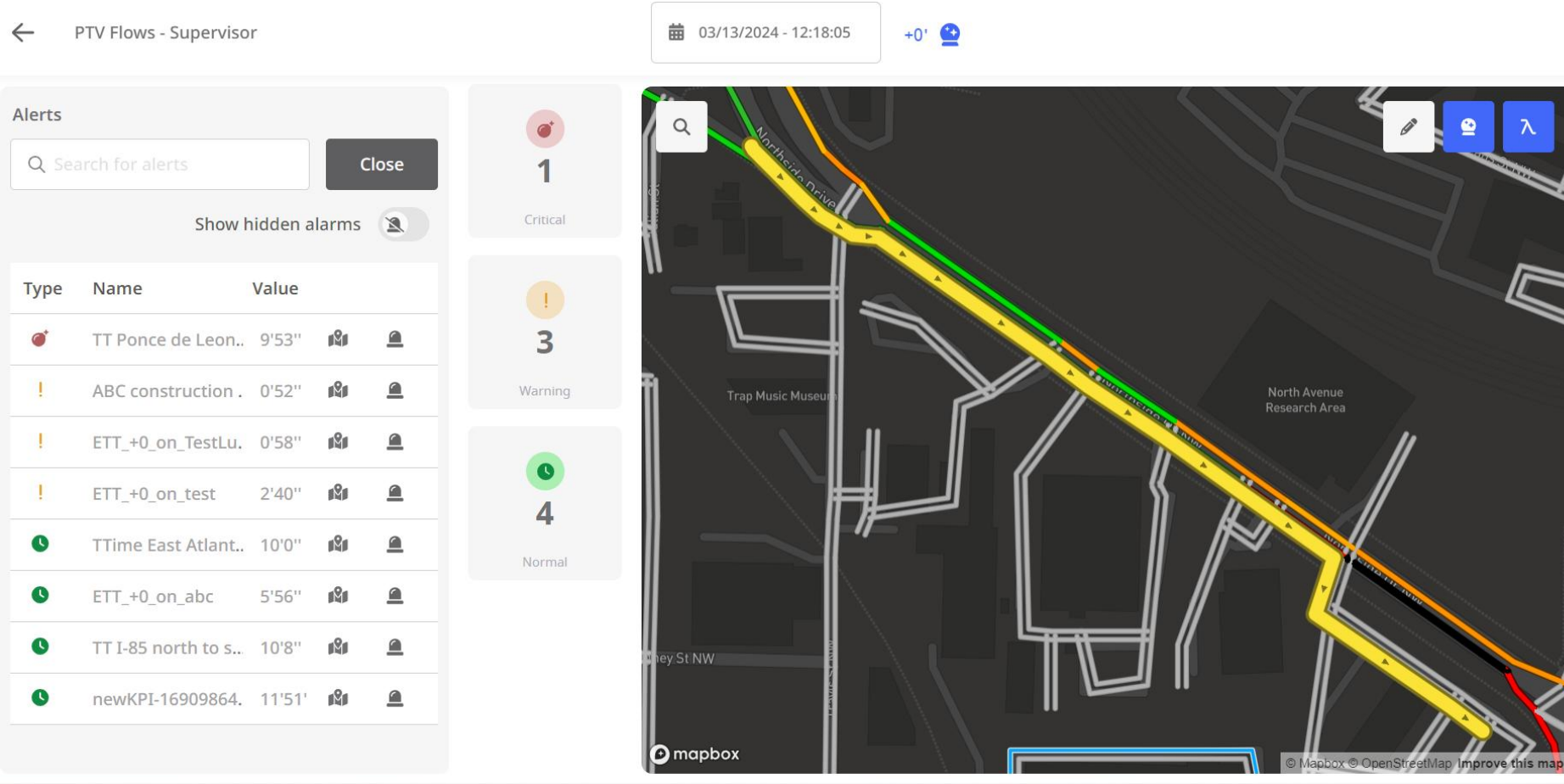


Real Time and Predictive Insights

- › 3rd Party Probe Data
- › No maintenance
- › Add new Origin-Destination routes on the fly
- › On local roads, County, and DOT
- › Predictive Capabilities up to 1hr
- › Tie directly into ATMS and Adaptive
 - › Proactive and Automatic Timing Plans



Real Time and Predictive Insights



Cloud-Based Traffic Operations

- › New AI insights
- › Recommendations for Signal Timing
 - › Optimized TOD Coordination
 - › Traffic Responsive
 - › Adaptive Operations
 - › New controller features/sequences
- › Can provide preview for Before/After
 - › Limited metrics
 - › Can't visualize full picture

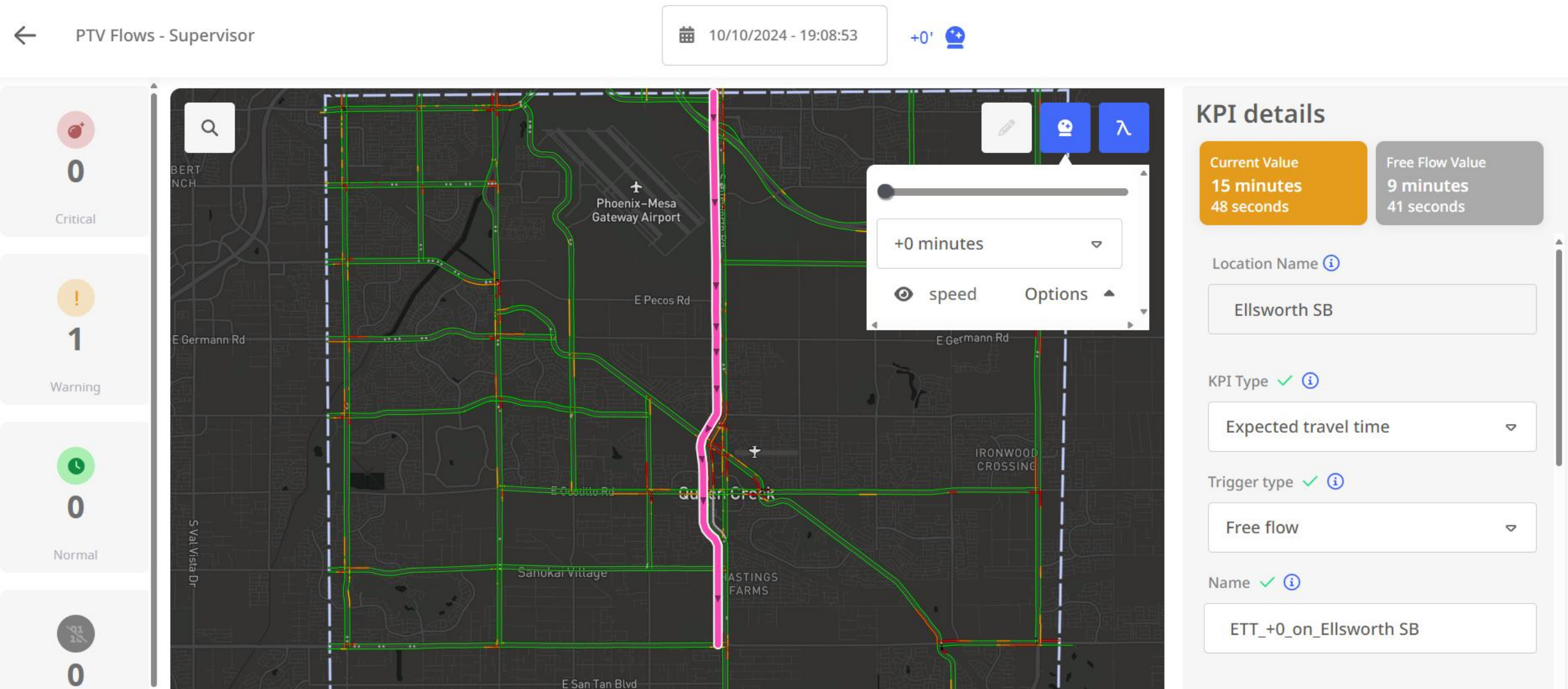


Digital Twin

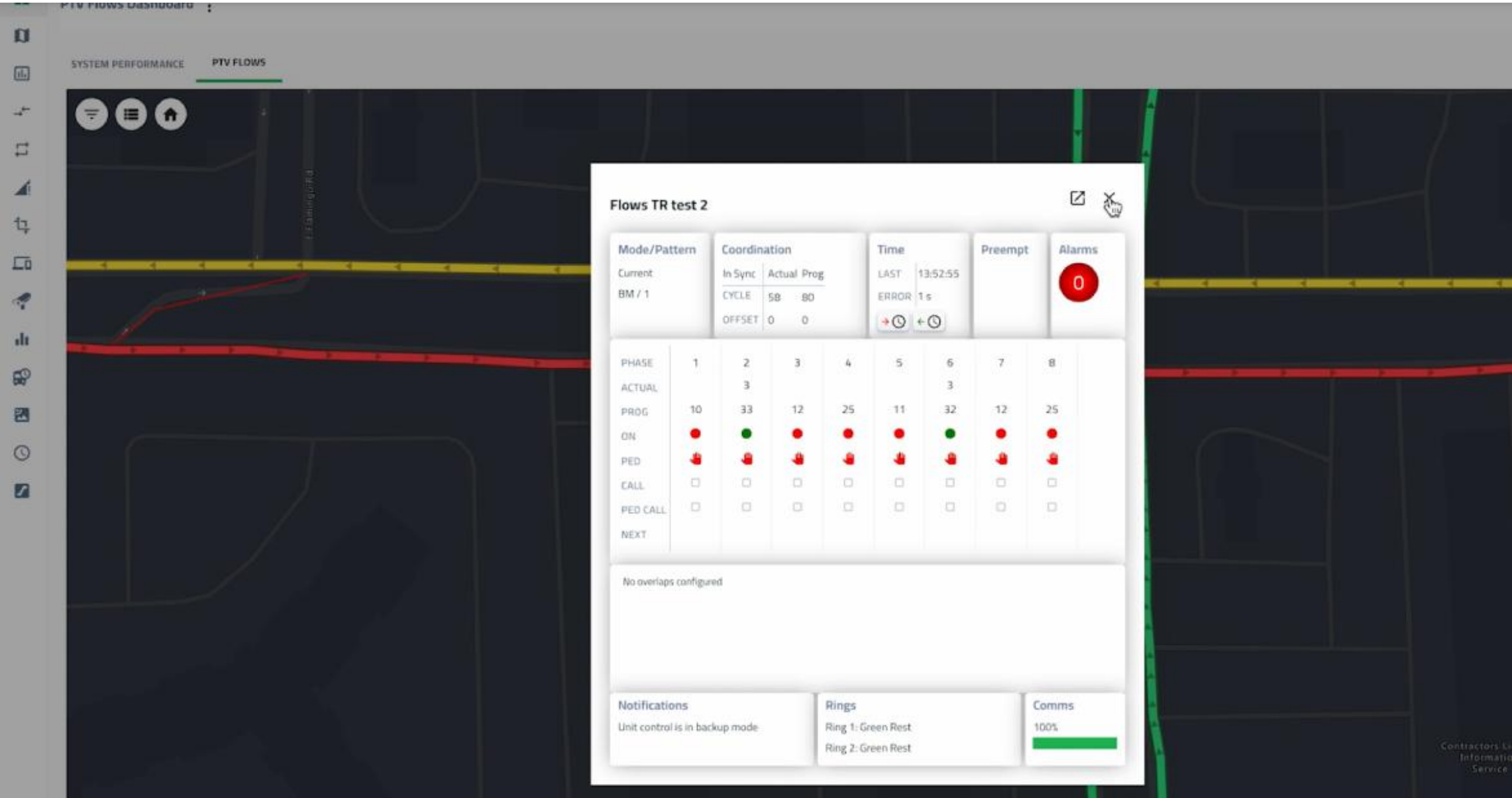
- › Virtual environment to replicate intersections in the field
- › Try things out without consequence
 - › Uses field data as inputs
- › ATMS downloads Optimized Signal Timing Data to Digital Twin
 - › Uses virtual traffic controllers to simulate real timing plans
- › See issues that can occur and fix before it hits the street



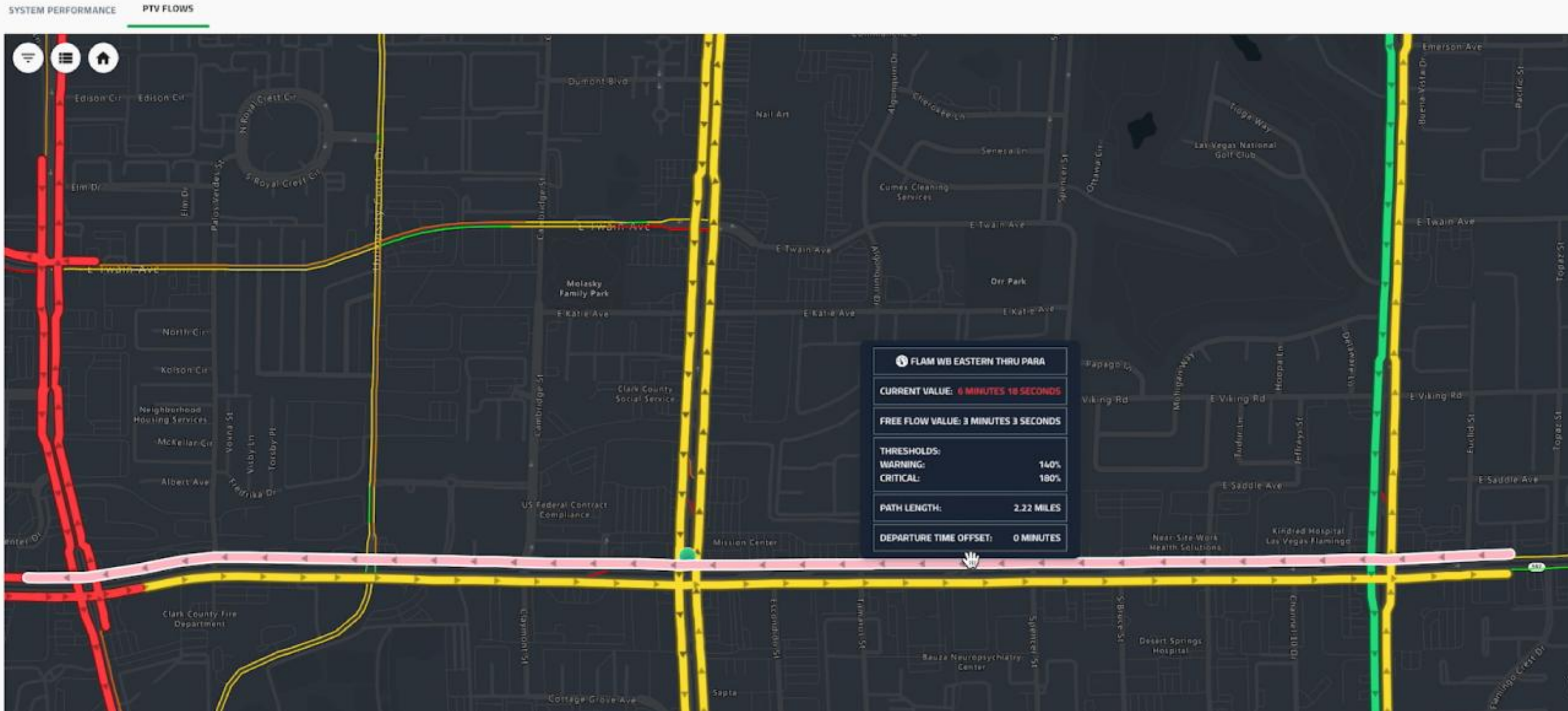
Town of Queen Creek



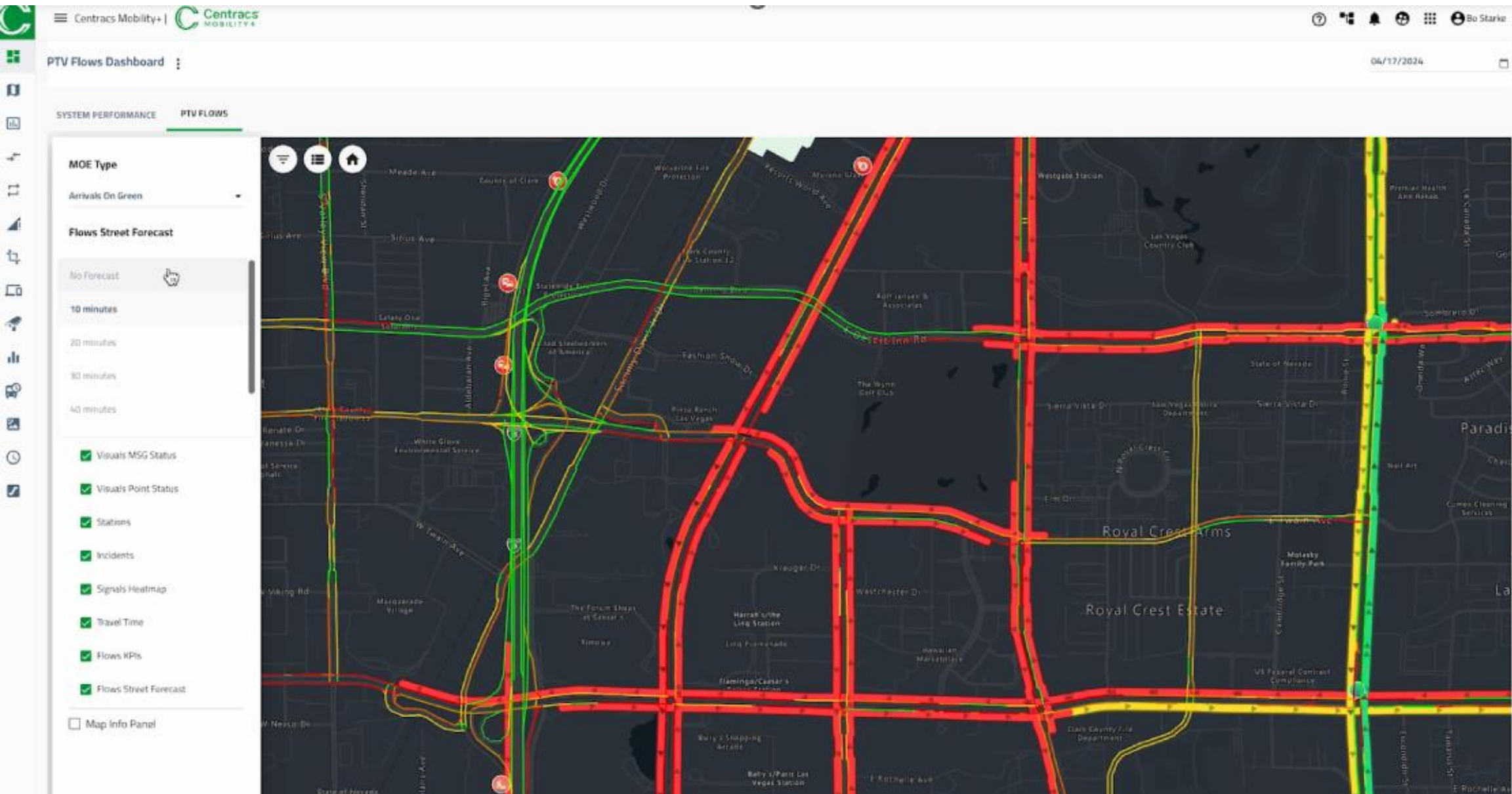
Signal Status



Travel Time Map Layer



Forecast Travel Time



Automated Alerts

Triggers | **Centrac's**
MOBILITY+

?

Bo Starke

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SITE

USER

MAP

HEAT MAP

PERFORMANCE

HOT SPOTS

DETECTORS

SIGNALS

CORRIDORS

EDAPTIVE ROUTES

CENTRACS+DETECT

ALERT RECIP

Find Trigger...

ENABLED	NAME	CRITICALITY	EVENT	DESCRIPTION
☒	Automation Test Flash On	Information	aut-flash-on	
☒	flash any off	Information	Flash: ALL OFF	Staging Test for SMS
☒	flash any on test	Information	aut-flash-on	Staging Test for SMS
☐	Automation Test	Information	aut-flash-on	
☐	Flash off SMS test	Information	Flash: ALL OFF	
☐	Flash On SMS test	Information	aut-flash-on	
☐	flows	Information	Flows KPI Warning	test
☐	ko test alert escalation		aut-flash-on	
☐	ko test preempt any on	Information	Preempt - ANY ON	
☐	ko test preempt any off	Information	Preempt - ALL OFF	
☐	System Control Off	Critical	Unit Control: System - OFF	

Items per page: 100

Add Trigger

Name

Flows Critical Alert - Flam

Description

e.g. This trigger activates ...

Triggering Event

Flows KPI Critical

Enabled

☒

Is Audible

☐

Details

Type

Count

Occurrences

1

Duration (minutes)

00

flam

Select/Unselect All

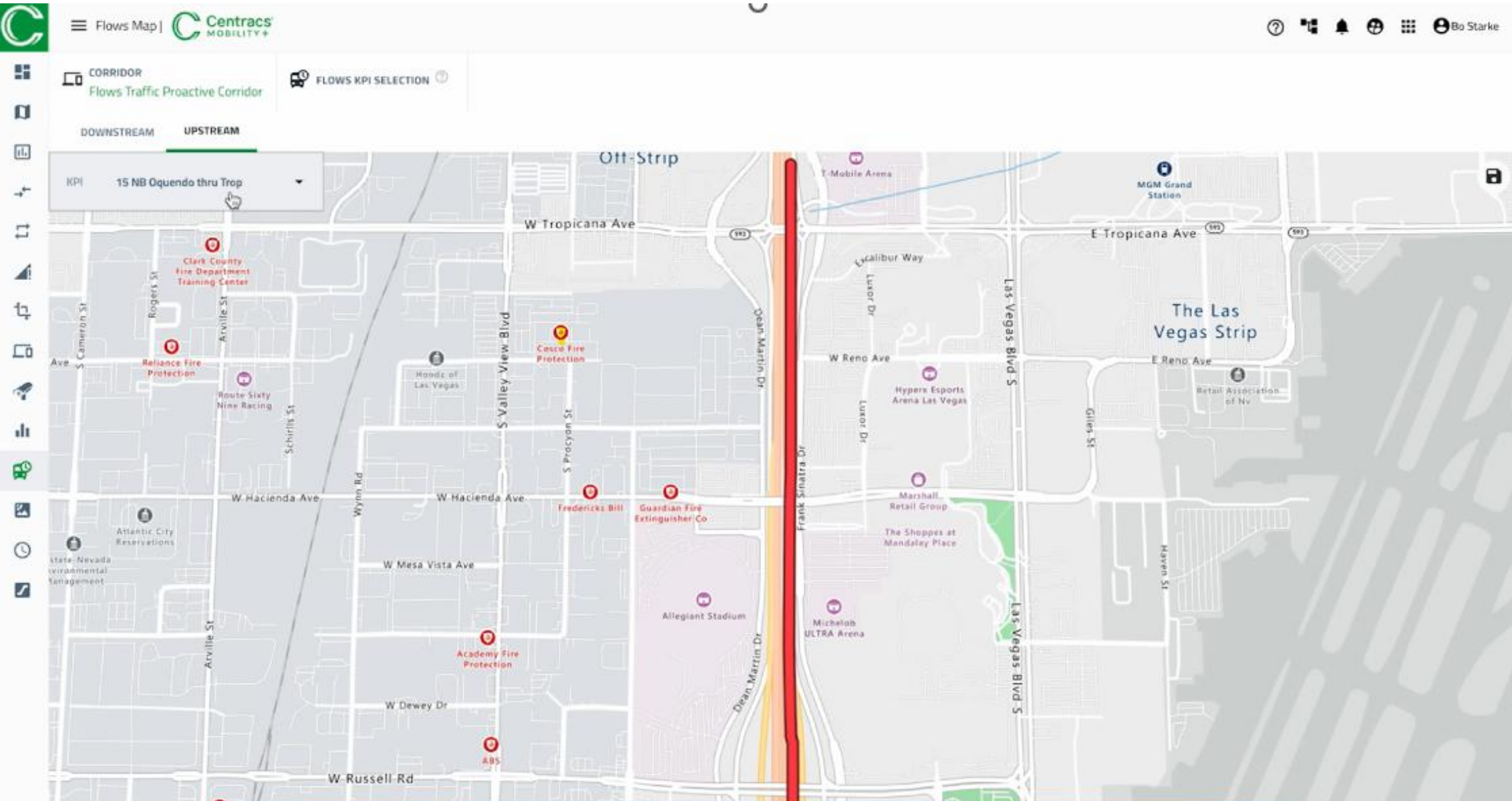
☒ ETT_+0_on_15 SB Flam through Hacienda

☒ ETT_+0_on_Flam EB 15 thru Para

☒ ETT_+0_on_Flam EB Para thru Eastern

17

Traffic Responsive



Use Predicted Time as an Input

The screenshot shows the 'Traffic Responsive (Speed) - Flows Traffic Proactive' settings page in the Centrac's Mobility+ application. The page has a top navigation bar with the Centrac's logo and a sidebar with various icons. The main content area is divided into tabs: 'SETTINGS', 'ARTERIAL', 'UPSTREAM', and 'DOWNSTREAM'. The 'SETTINGS' tab is active, showing a list of configuration options for the 'Flows API' speed data source. A dropdown menu is open for 'Flows Prediction Time Ahead', showing options 10, 20, and 30. The '10' option is selected and highlighted by a mouse cursor. Other settings include 'Speed Data Source' (Flows API), 'Number of minutes ahead to predict speed for' (20), 'Interval (mins)' (30), 'Frequency with which TR runs on this Section, in minutes.' (0), 'Min Pattern Execution Time' (0), 'Threshold and Pattern Matrix' (a dropdown with a menu icon), 'Immediate Update Threshold (%)' (20), 'Cycle Levels (%)' (20), and 'Offset Levels (%)' (20).

Optimizations | Centrac's MOBILITY+

Traffic Responsive (Speed) - Flows Traffic Proactive

Computational Channels

SETTINGS | ARTERIAL | UPSTREAM | DOWNSTREAM

Speed Data Source: Flows API

Source to pull Speed data from. Travel Time API comes from Azure's last measured speeds. Flows API comes from predicted future speeds.

Flows Prediction Time Ahead: 10

Number of minutes ahead to predict speed for: 20

Interval (mins): 30

Frequency with which TR runs on this Section, in minutes.

Min Pattern Execution Time: 0

Number of minutes that must pass before TR will send a pattern change. A value of 0 sends pattern changes as they are computed.

Threshold and Pattern Matrix: ...

Threshold and pattern definitions to use.

Immediate Update Threshold (%)

If the change between the previous channel value and the new value(before smoothing) exceeds this threshold, TR skips threshold levels and goes directly to the one that corresponds to the new channel value. Normally, threshold levels can only be one.

Cycle Levels (%): 20

Offset Levels (%): 20

Turn on Adaptive

≡ Edaptive | 











 Michael Villafuert

SUCCESS	CRITICAL	WARNING	INFORMATION	
TIME	PATTERN	MODE	STATUS	ACTION
10:00 AM	2	Analysis	 Edaptive Completed Successfully	
09:59 AM	2	Analysis	 Edaptive Completed Successfully	
09:57 AM	2	Analysis	 Edaptive Completed Successfully	
09:56 AM	2	Analysis	 Edaptive Completed Successfully	
09:54 AM	2	Analysis	 Edaptive Completed Successfully	
09:53 AM	2	Analysis	 Edaptive Completed Successfully	
09:51 AM	2	Analysis	 Edaptive Completed Successfully	
09:50 AM	2	Analysis	 Edaptive Completed Successfully	
09:49 AM	2	Analysis	 Edaptive Completed Successfully	
09:48 AM	2	Analysis	 Edaptive Completed Successfully	
09:47 AM	2	Analysis	 Edaptive Completed Successfully	
09:46 AM	2	Analysis	 Edaptive Completed Successfully	
09:45 AM	2	Analysis	 Edaptive Completed Successfully	
09:44 AM	2	Analysis	 Edaptive Completed Successfully	
09:43 AM	2	Analysis	 Edaptive Completed Successfully	
09:42 AM	2	Analysis	 Edaptive Completed Successfully	
09:41 AM	2	Analysis	 Edaptive Completed Successfully	
09:40 AM	2	Analysis	 Edaptive Completed Successfully	

Town of Queen Creek

- › Coordinated Signal in front of School
- › Highly Sensitive intersection
- › 30 min problem around school drop off
- › Limited left-turn storage
 - › Created a large spill back condition
- › Good amount of NB through volume
 - › Created a starvation
- › The Town wanted to try several scenarios but couldn't implement them during drop-off period
- › Using cloud based ATMS to optimize to send to Digital Twin



Traffic Contrc

Automatic Optimization

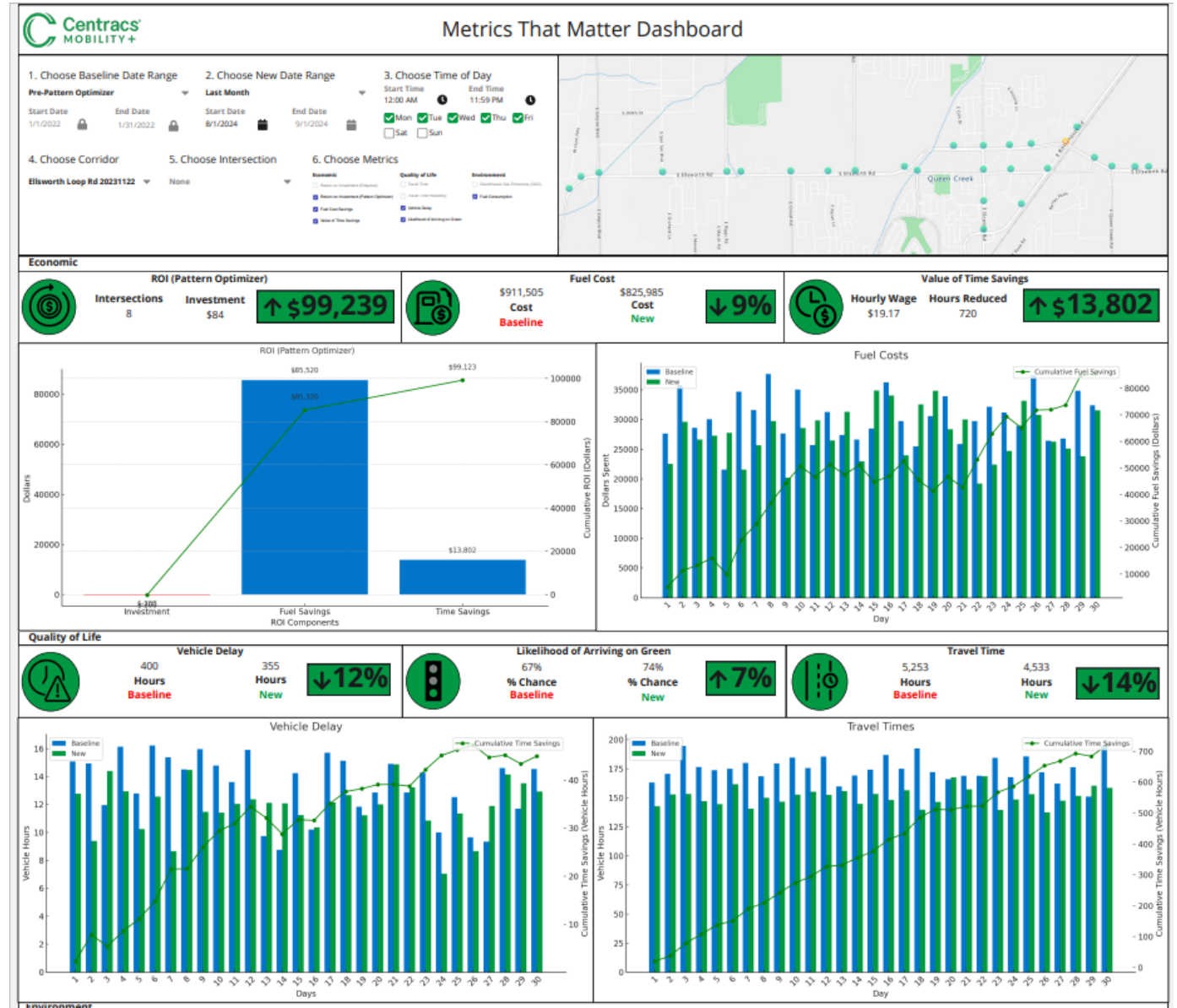
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Digital Twin – Connect ATMS to Vissim



Metrics That Matter

- › **Return on Investment (ROI)**
- › **Easy to understand**
 - › Fuel Costs
 - › Time Savings
 - › Vehicle Delay
 - › Travel Time
 - › Uses Travel Time API
- › **Quick and efficient**





econolite.com