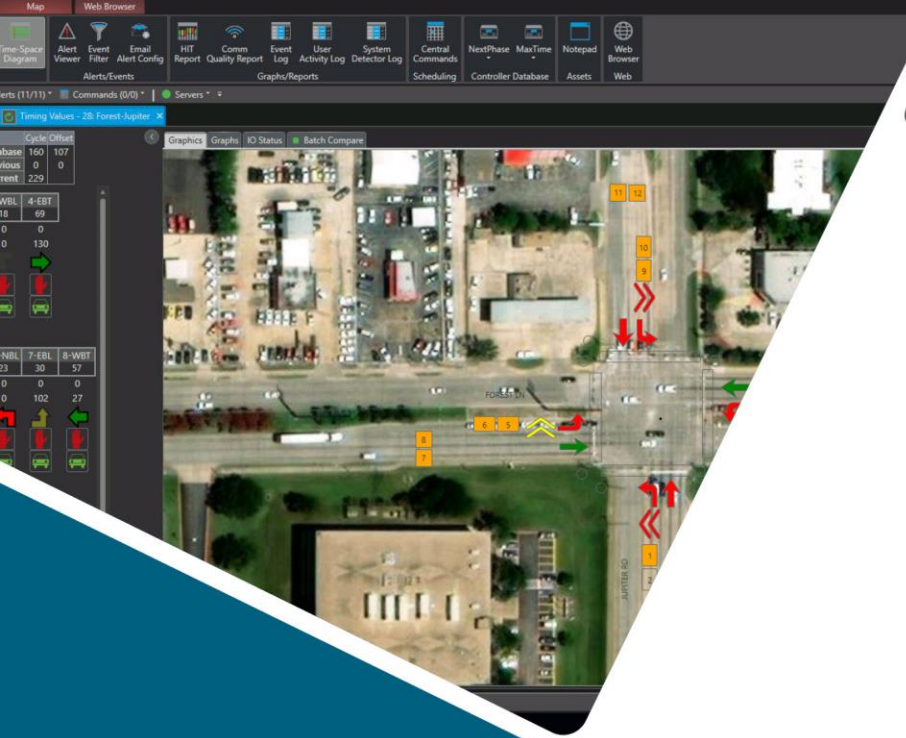




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Smart City Technology Roadmap

»»KITS

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»»Kadence

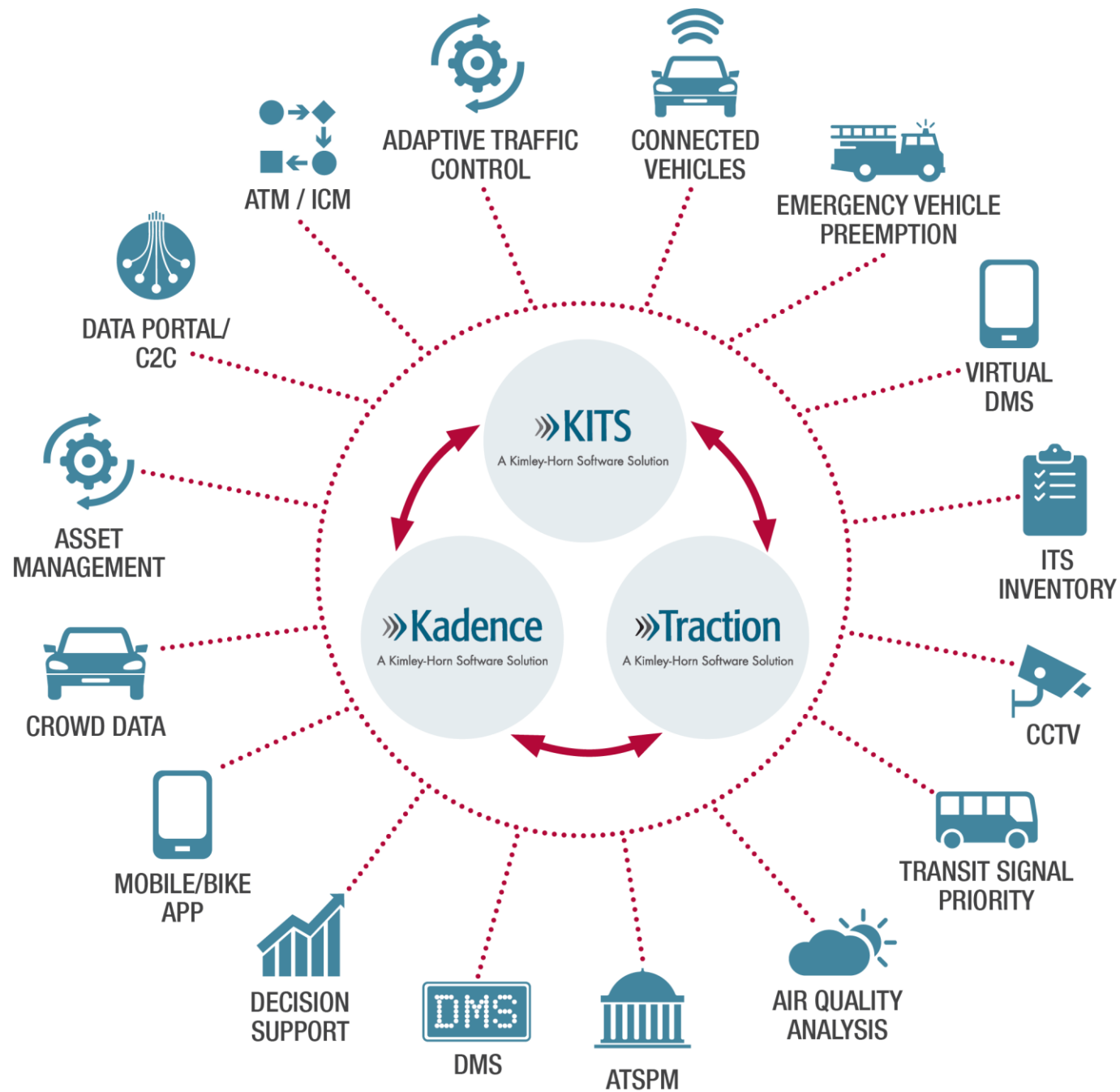
A Kimley-Horn Software Solution

»»Traction

A Kimley-Horn Software Solution

»»Smart Priority

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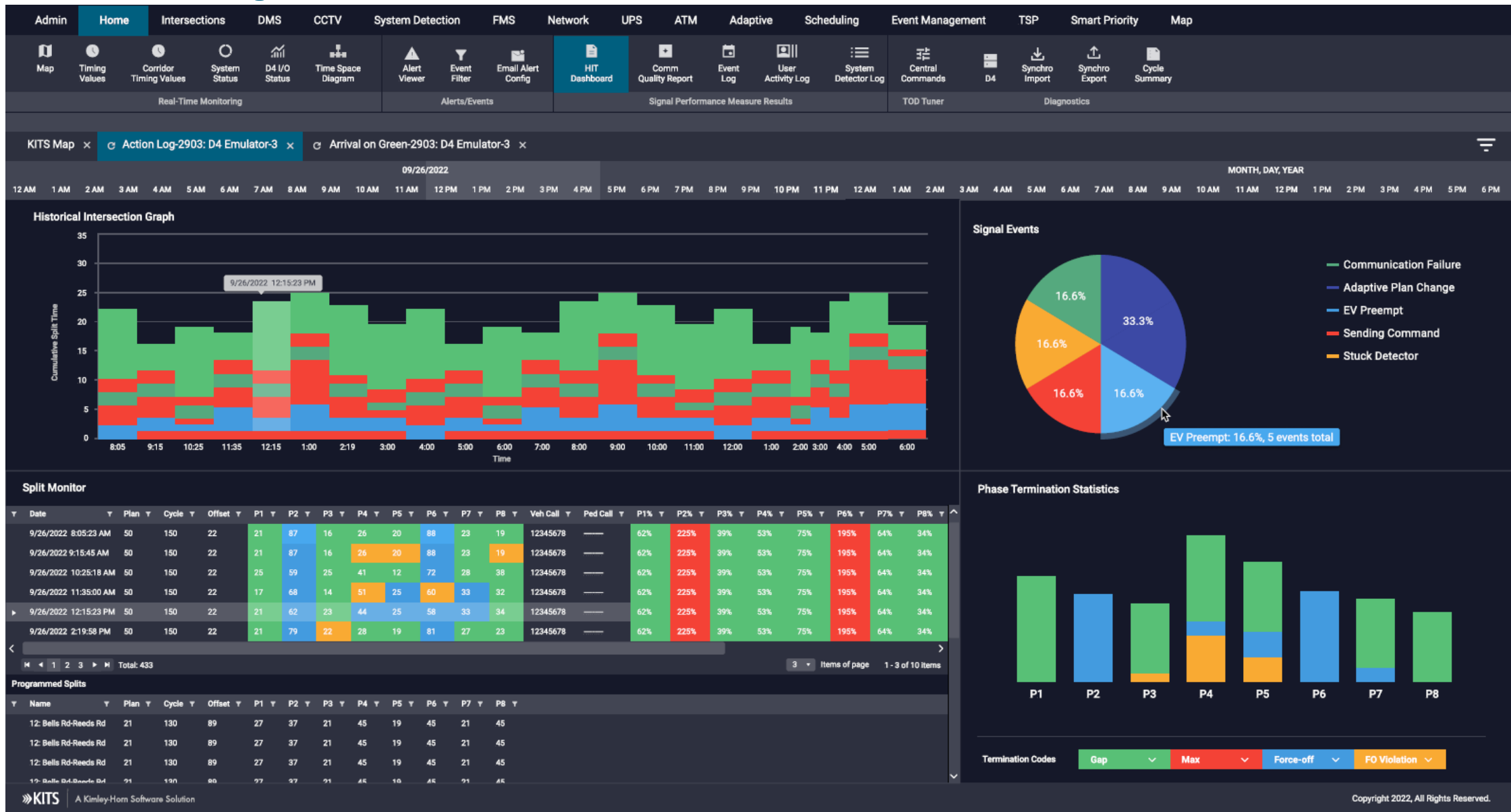


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Trafficware Commander



HIT Report++



KITS Map × Action Log-2903: D4 Emulator-3 × Arrival on Green-2903: D4 Emulator-3 ×

09/26/2022

MONTH, DAY, YEAR

12 AM 1 AM 2 AM 3 AM 4 AM 5 AM 6 AM 7 AM 8 AM 9 AM 10 AM 11 AM 12 PM 1 PM 2 PM 3 PM 4 PM 5 PM 6 PM

12 AM 1 AM 2 AM 3 AM 4 AM 5 AM 6 AM 7 AM 8 AM 9 AM 10 AM 11 AM 12 PM 1 PM 2 PM 3 PM 4 PM 5 PM 6 PM

Historical Intersection Graph

Cumulative Split Time

Time

9/26/2022 12:15:23 PM

Signal Events

Communication Failure 16.6%

Adaptive Plan Change 33.3%

EV Preempt 16.6%

Sending Command 16.6%

Stuck Detector 16.6%

EV Preempt: 16.6%, 5 events total

Split Monitor

Date	Plan	Cycle	Offset	P1	P2	P3	P4	P5	P6	P7	P8	Veh Call	Ped Call	P1%	P2%	P3%	P4%	P5%	P6%	P7%	P8%
9/26/2022 8:05:23 AM	50	150	22	21	87	16	26	20	88	23	19	12345678	---	62%	225%	39%	53%	75%	195%	64%	34%
9/26/2022 9:15:45 AM	50	150	22	21	87	16	26	20	88	23	19	12345678	---	62%	225%	39%	53%	75%	195%	64%	34%
9/26/2022 10:25:18 AM	50	150	22	25	59	25	41	12	72	28	38	12345678	---	62%	225%	39%	53%	75%	195%	64%	34%
9/26/2022 11:35:00 AM	50	150	22	17	68	14	51	25	60	33	32	12345678	---	62%	225%	39%	53%	75%	195%	64%	34%
9/26/2022 12:15:23 PM	50	150	22	21	62	23	44	25	58	33	34	12345678	---	62%	225%	39%	53%	75%	195%	64%	34%
9/26/2022 2:19:58 PM	50	150	22	21	79	22	28	19	81	27	23	12345678	---	62%	225%	39%	53%	75%	195%	64%	34%

Total: 433

3 Items of page 1 - 3 of 10 Items

Phase Termination Statistics

P1 P2 P3 P4 P5 P6 P7 P8

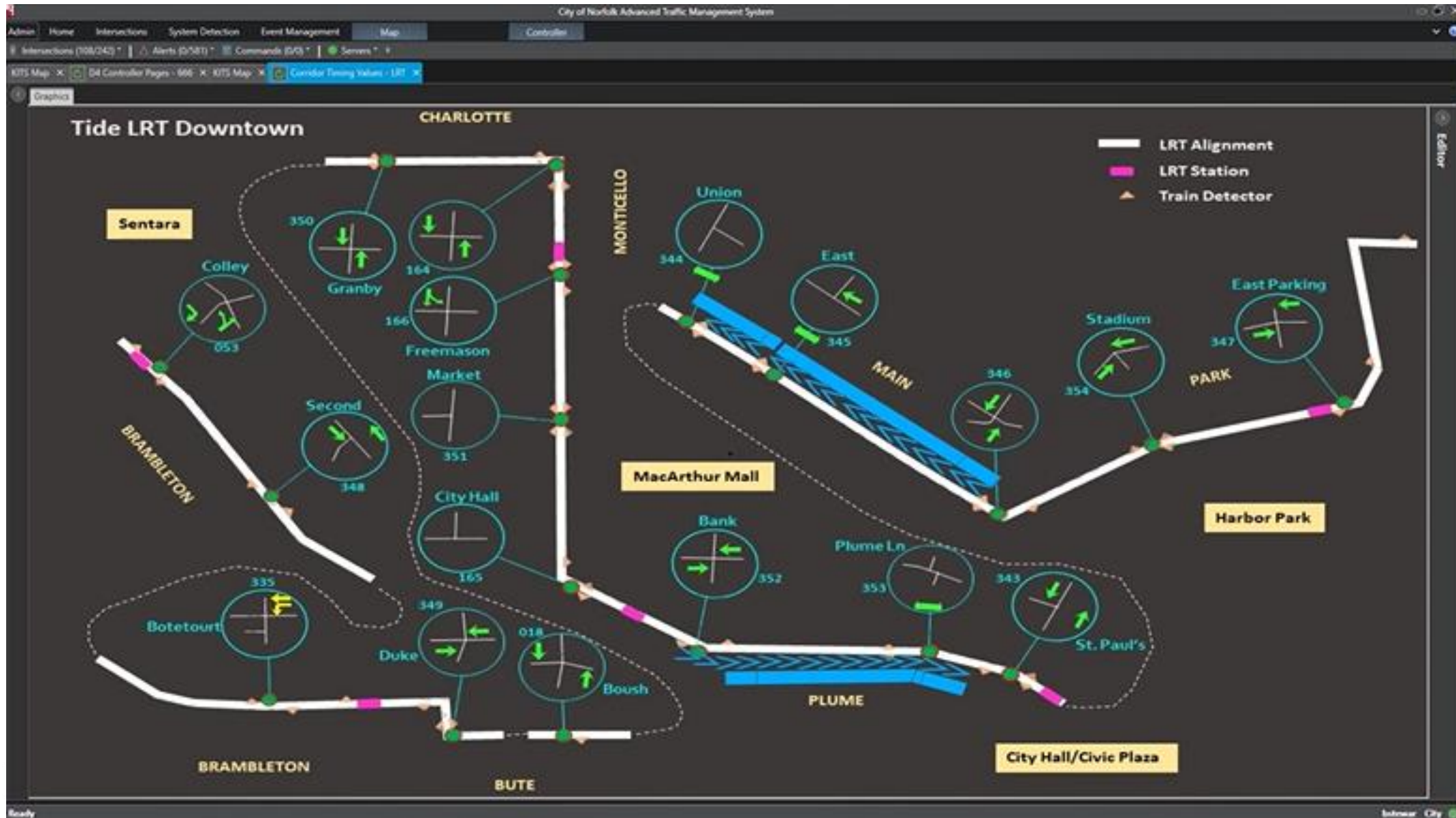
Termination Codes Gap Max Force-off FO Violation

KITS

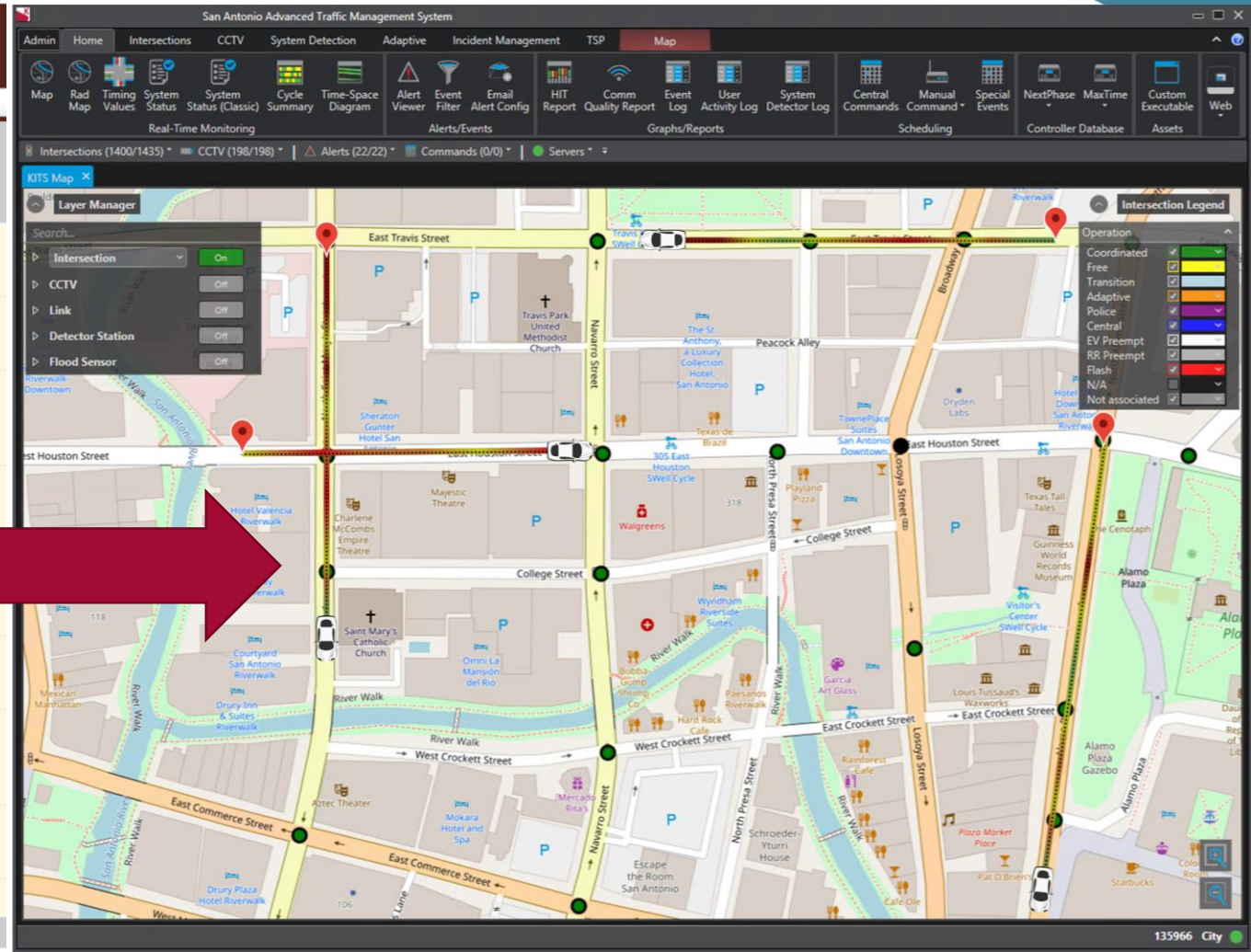
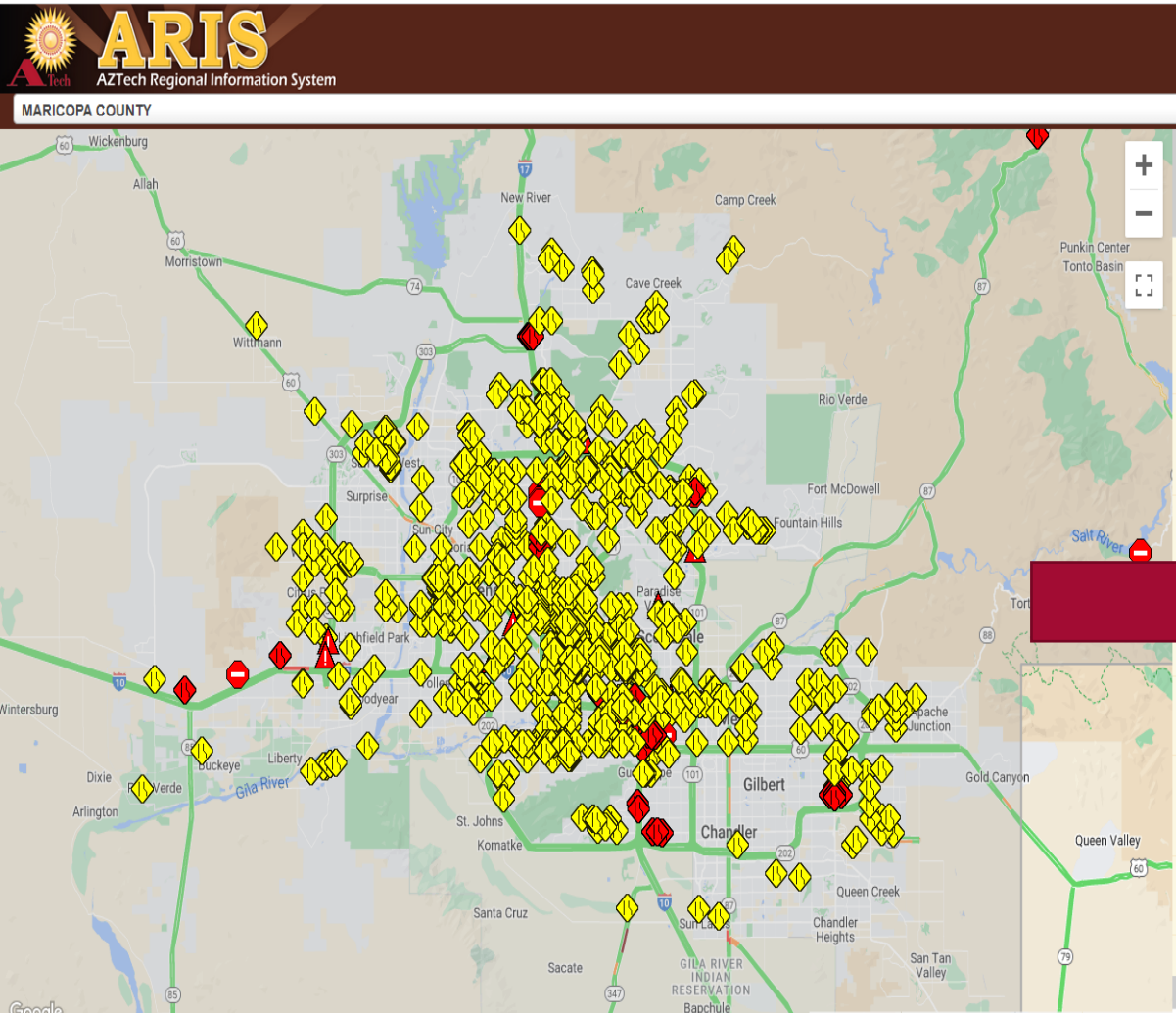
A Kinley-Horn Software Solution

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Configurable Corridor Layout Graphics



Waze/CAD alerts on Map



Ad Hoc Alerts/Algorithms in “Congestion Manager”

The screenshot displays the 'Congestion Manager - ATSPM Alerts' software interface. On the left, there are panels for 'Device Types' (Intersection Detectors, Detector Stations, Gridsmart Video Detectors, Bluetooth Routes, Traction Travel Times) and 'Devices' (listing systems like Sys40, Sys41, Sys42). Below these are 'Fields' (Volume, Occupancy, Speed, Status) and 'Logical Operators' (Greater Than, etc.). The main area is a spreadsheet-like table with columns A through F. The table contains several rows of data, including a header row for 'Algorithms' and a 'Legend' column. The data rows show algorithm names, logic, current values, and minutes before applying. The right side of the interface has a 'Navigation Options' panel with buttons for Intersection Detectors, Detector Stations, Gridsmart Video Detectors, Bluetooth Segments, Traction Travel Times, Algorithms (highlighted), Actions, and Commands.

Algorithm Name	Algorithm Logic	Current Value	Minutes Before Applying
ATSPM AOG Lower Than Expected	AOG <= 50%	65	120
ATSPM Phase Failures Too High	PhaseFail(2) > 20	9	60

- The arrivals on green on an approach has dropped below a threshold
- An ICM plan command has been received
- Unexpected repetitive phase skips
- Anything else you can dream up to go further than “persistence” and “count” in the current alert definitions
- **Traction Travel, Traction Connect**

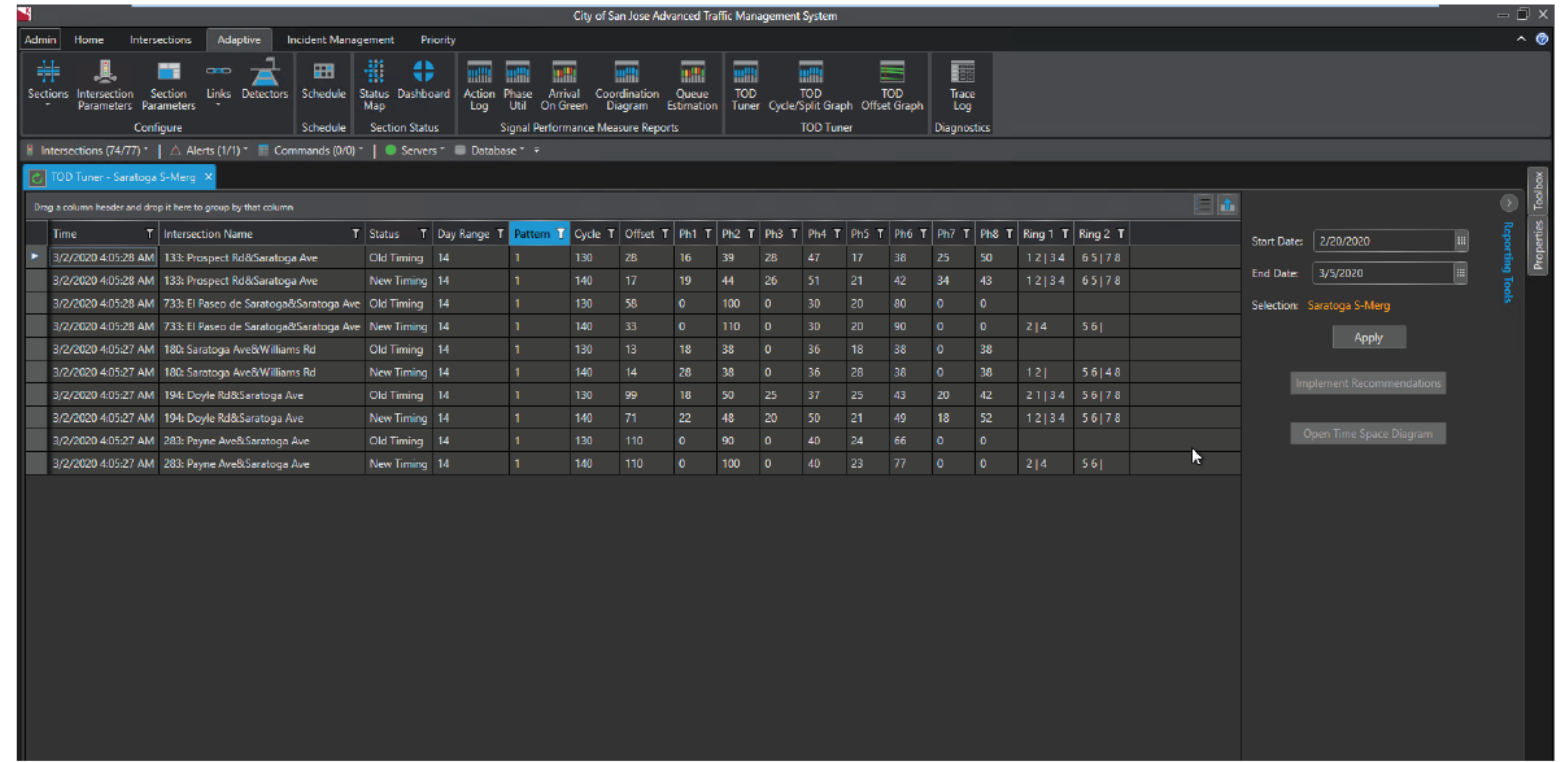


»» Kadence

A Kimley-Horn Software Solution

SigOps/ATSPM + Kadence TOD Tuner

- AI-driven signal timing recommendations
- “Slow adaptive” with suboptimal detection
- Max Outs, Ped calls, etc. in lieu of robust phase utilization and arrivals on green measures



Time	Intersection Name	Status	Day Range	Pattern	Cycle	Offset	Ph1	Ph2	Ph3	Ph4	Ph5	Ph6	Ph7	Ph8	Ring 1	Ring 2
3/2/2020 4:05:28 AM	133: Prospect Rd&Saratoga Ave	Old Timing	14	1	130	28	16	39	28	47	17	38	25	50	1 2 3 4	6 5 7 8
3/2/2020 4:05:28 AM	133: Prospect Rd&Saratoga Ave	New Timing	14	1	140	17	19	44	26	51	21	42	34	43	1 2 3 4	6 5 7 8
3/2/2020 4:05:28 AM	733: El Paseo de Saratoga&Saratoga Ave	Old Timing	14	1	130	58	0	100	0	30	20	80	0	0		
3/2/2020 4:05:28 AM	733: El Paseo de Saratoga&Saratoga Ave	New Timing	14	1	140	33	0	110	0	30	20	90	0	0	2 4	5 6
3/2/2020 4:05:27 AM	180: Saratoga Ave&Williams Rd	Old Timing	14	1	130	13	18	38	0	36	18	38	0	38		
3/2/2020 4:05:27 AM	180: Saratoga Ave&Williams Rd	New Timing	14	1	140	14	28	38	0	36	28	38	0	38	1 2	5 6 4 8
3/2/2020 4:05:27 AM	194: Doyle Rd&Saratoga Ave	Old Timing	14	1	130	99	18	50	25	37	25	43	20	42	2 1 3 4	5 6 7 8
3/2/2020 4:05:27 AM	194: Doyle Rd&Saratoga Ave	New Timing	14	1	140	71	22	48	20	50	21	49	18	52	1 2 3 4	5 6 7 8
3/2/2020 4:05:27 AM	283: Payne Ave&Saratoga Ave	Old Timing	14	1	130	110	0	90	0	40	24	66	0	0		
3/2/2020 4:05:27 AM	283: Payne Ave&Saratoga Ave	New Timing	14	1	140	110	0	100	0	40	23	77	0	0	2 4	5 6

»» **TractionLive**
View real-time system status from your web browser or mobile device.

»» **TractionTravel**
Collect, analyze, and automate travel time data and alerts.

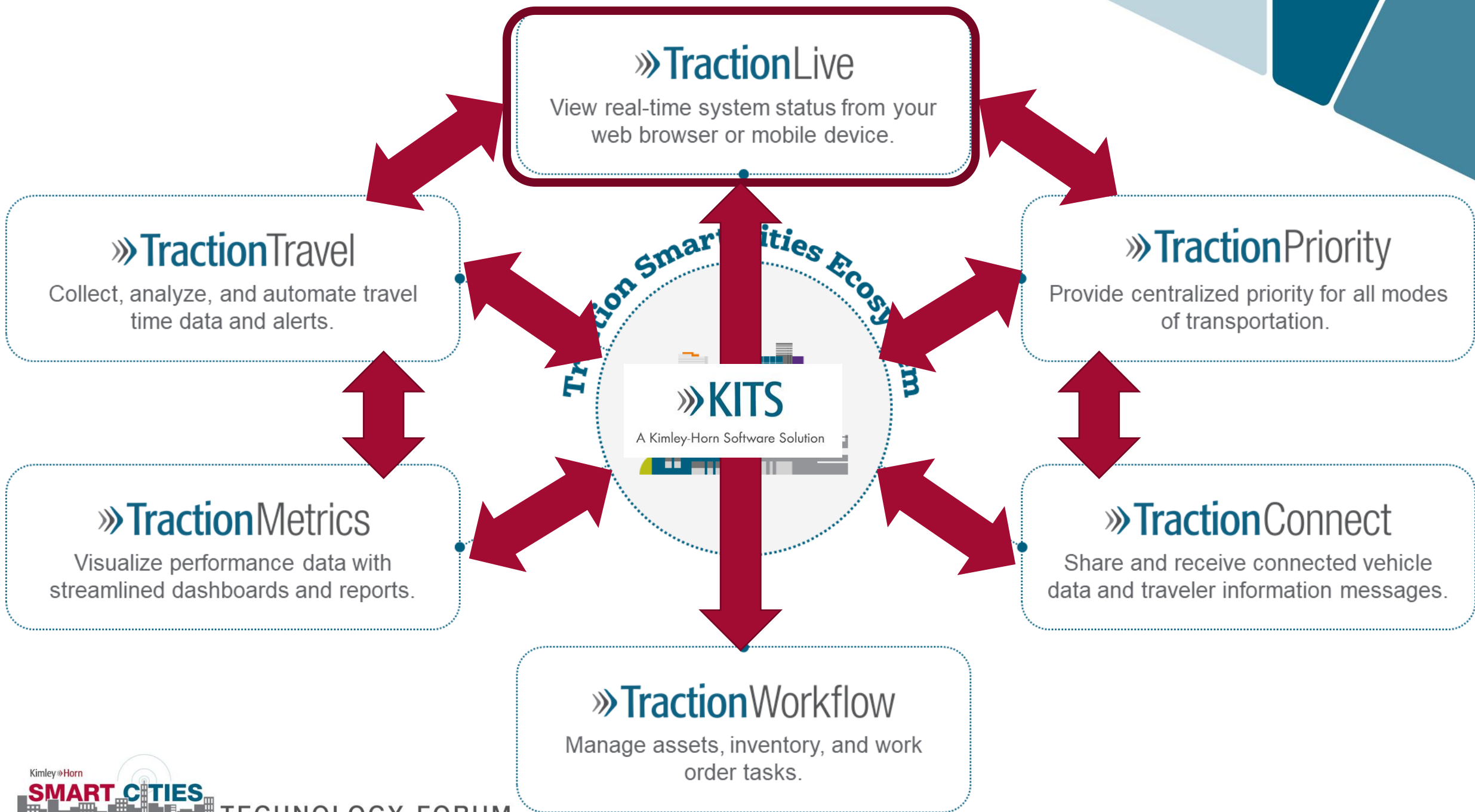
»» **TractionPriority**
Provide centralized priority for all modes of transportation.

»» **TractionMetrics**
Visualize performance data with streamlined dashboards and reports.

»» **TractionConnect**
Share and receive connected vehicle data and traveler information messages.

»» **TractionWorkflow**
Manage assets, inventory, and work order tasks.

Traction Smart Cities Ecosystem



👁 Insights

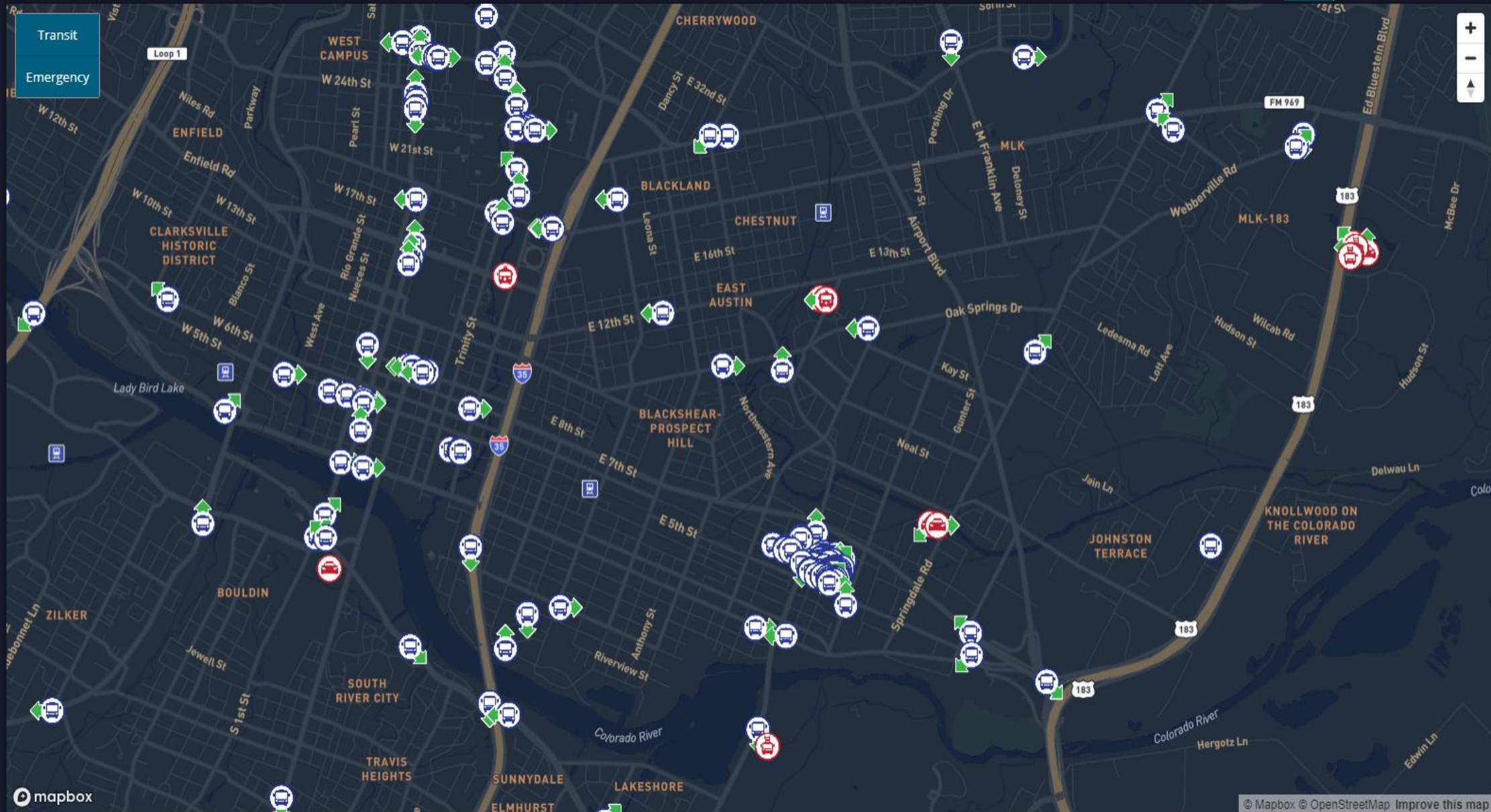
🕒 Live Status

📄 Reports

⚙ Configure

Map

System

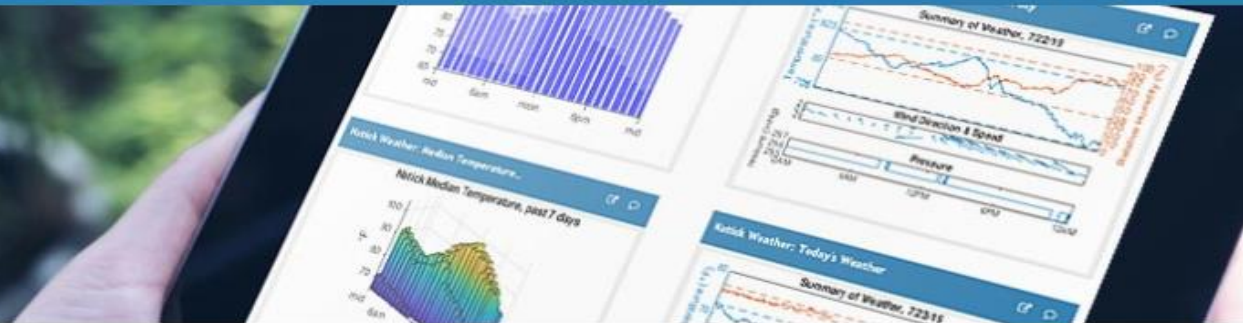


Properties
Toolbox

100



ThingSpeak for Environmental Monitoring



Environmental sensors let you measure the presence of pollution. ThingSpeak™ lets you store, see, and understand that data.

- See instant visualizations of data posted from your sensors
- Perform online analysis and data processing with MATLAB® and create automatic visualizations from live processed data
- Build Internet of Things (IoT) systems without setting up servers or developing web software

For small- to medium-sized IoT systems, ThingSpeak provides a hosted solution that you can use in production.

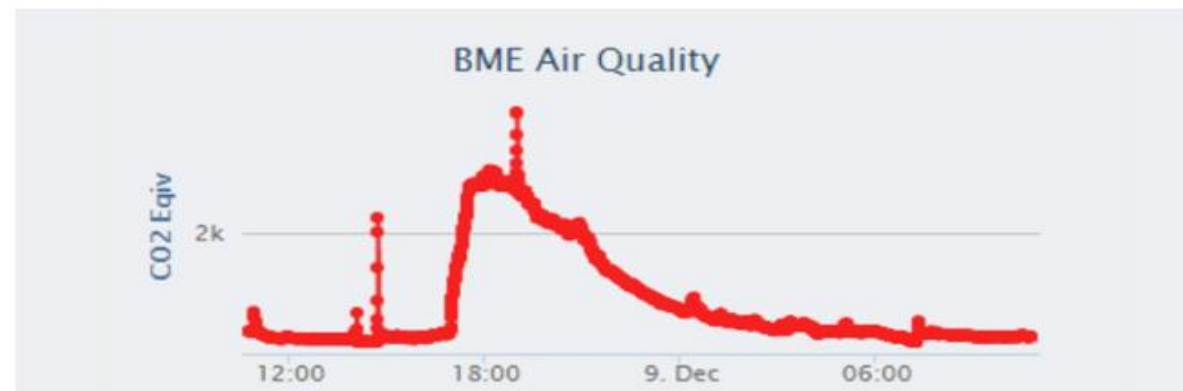


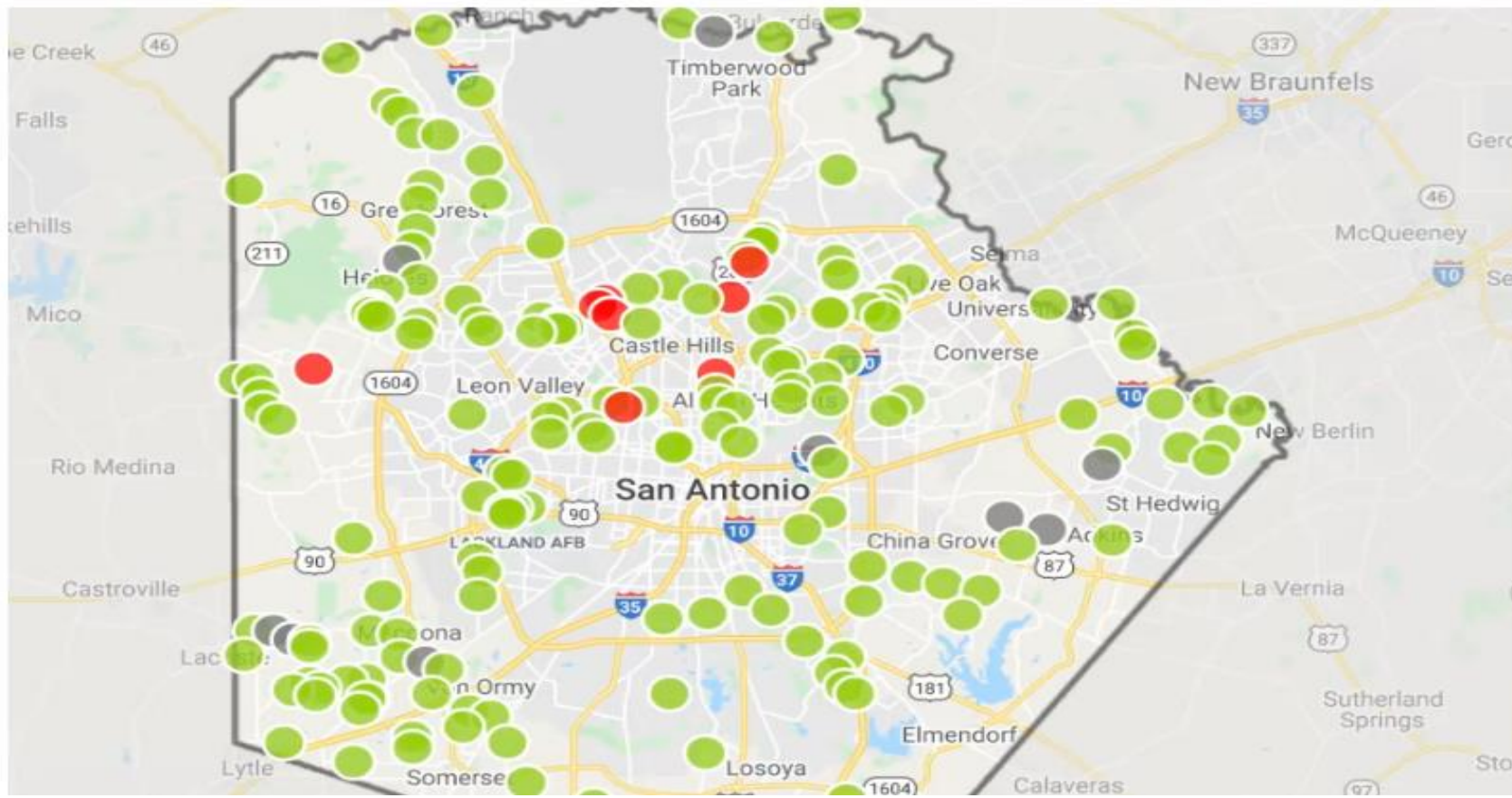
Environmental data isn't useful at the weather station or field sensor. Putting your data in the cloud lets you monitor the data and act on it immediately.

Analyze Your Environmental Data in the Cloud

ThingSpeak is an IoT analytics platform service from MathWorks®, the makers of MATLAB and Simulink®.

- Create [live analysis](#)
- Apply advanced analytics from MATLAB to your environmental data, including machine learning and statistical models
- [Monitor air quality to ensure COVID-19 safety](#)
- Process and store data from thousands of environmental

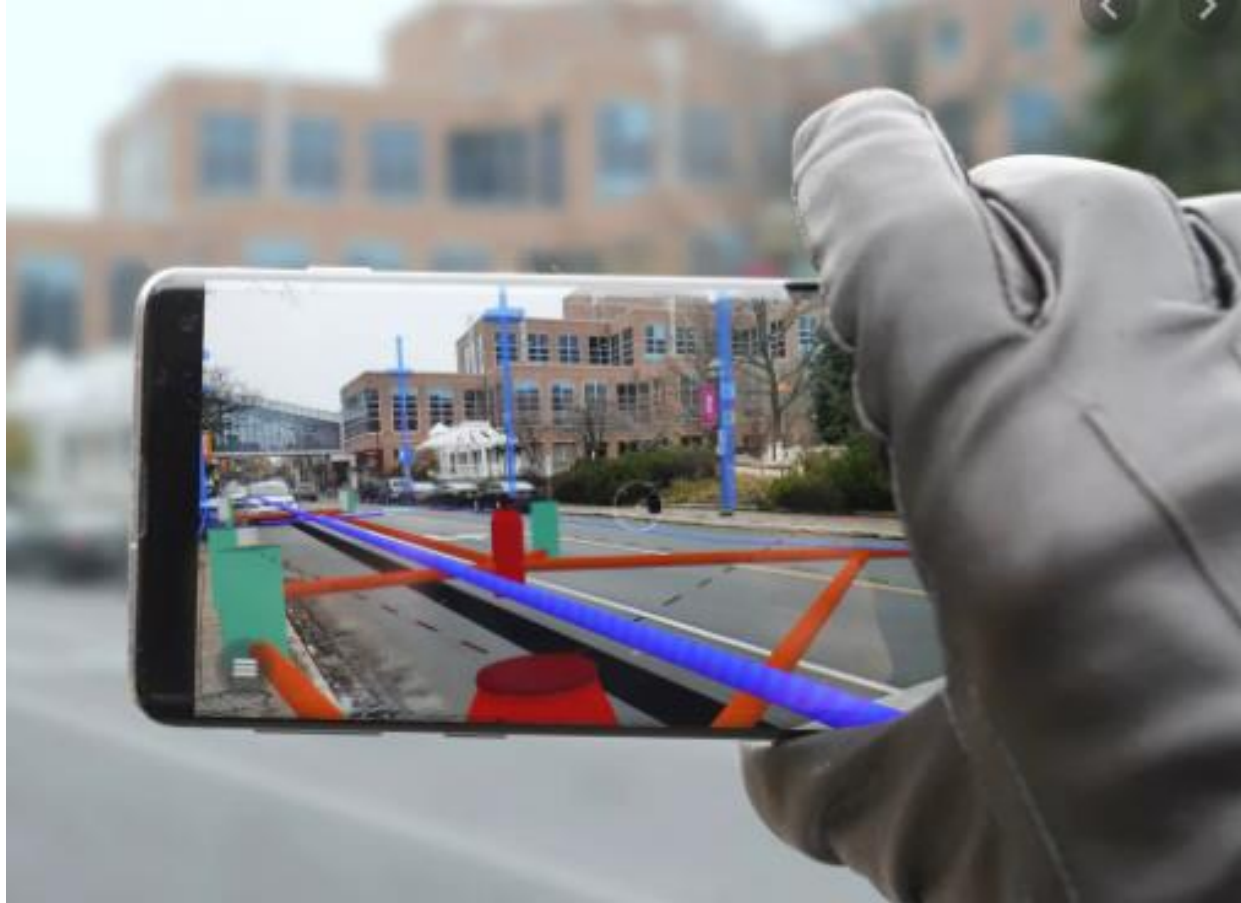




Traffic Signal “Digital Twin”

- USDOT/DOE efforts to standardize AI tracking sensor APIs
- Traffic signal controllers have no current way to use vehicle trajectories in a meaningful way
- TMDD needs updates (ITE)
- New digital twin “standard” emerging that encapsulates:
 - TMDD description
 - Connected Vehicle “MAP” geometry
 - Other asset attribute details

Augmented Reality – Asset Management Adjunct

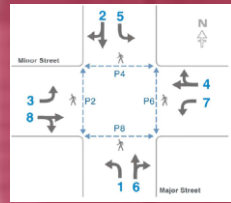


Iteris Video
detection
16 outputs

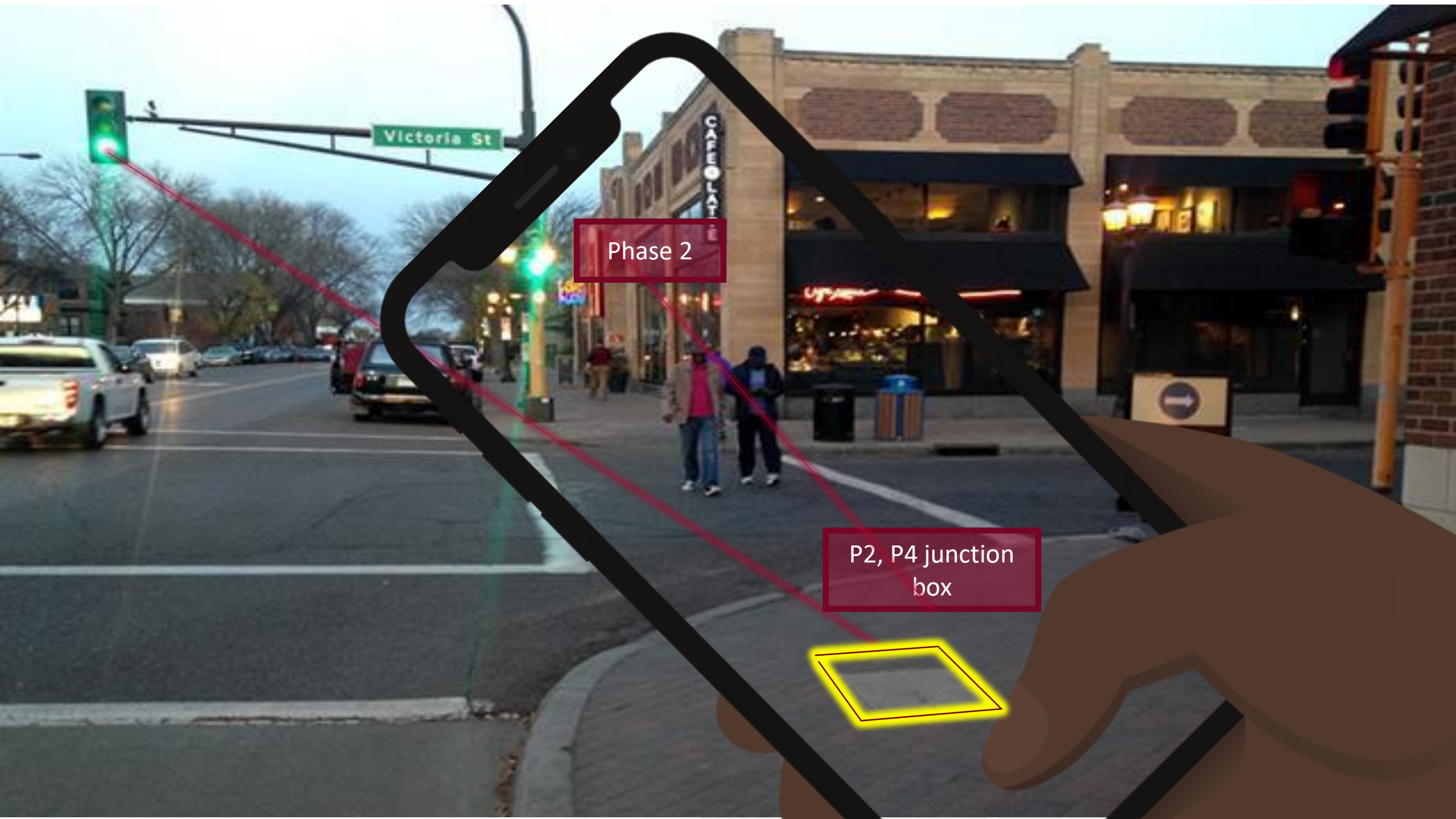
Intelight 2070
D4 1.5L-36

IP Copper
black&green NB to
Main & 2nd

IP Copper
black&green SB to
Main & Jefferson

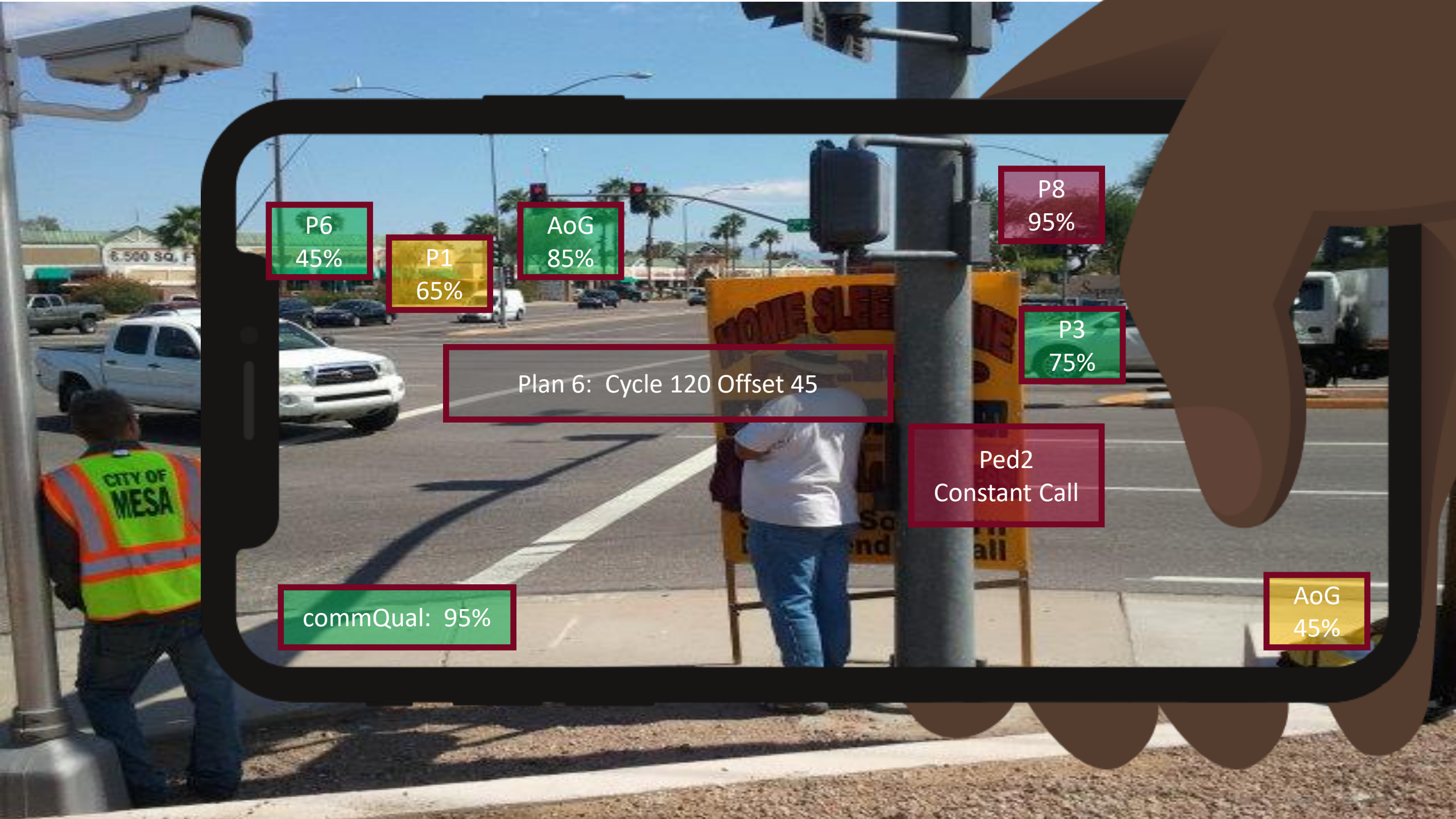


What's in there?



Phase 2

P2, P4 junction
box



P6
45%

P1
65%

AoG
85%

P8
95%

P3
75%

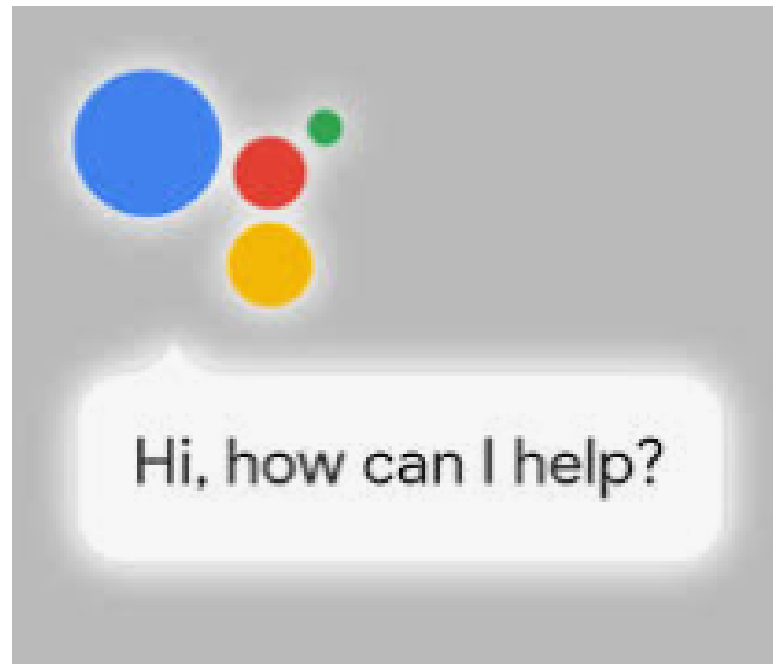
Plan 6: Cycle 120 Offset 45

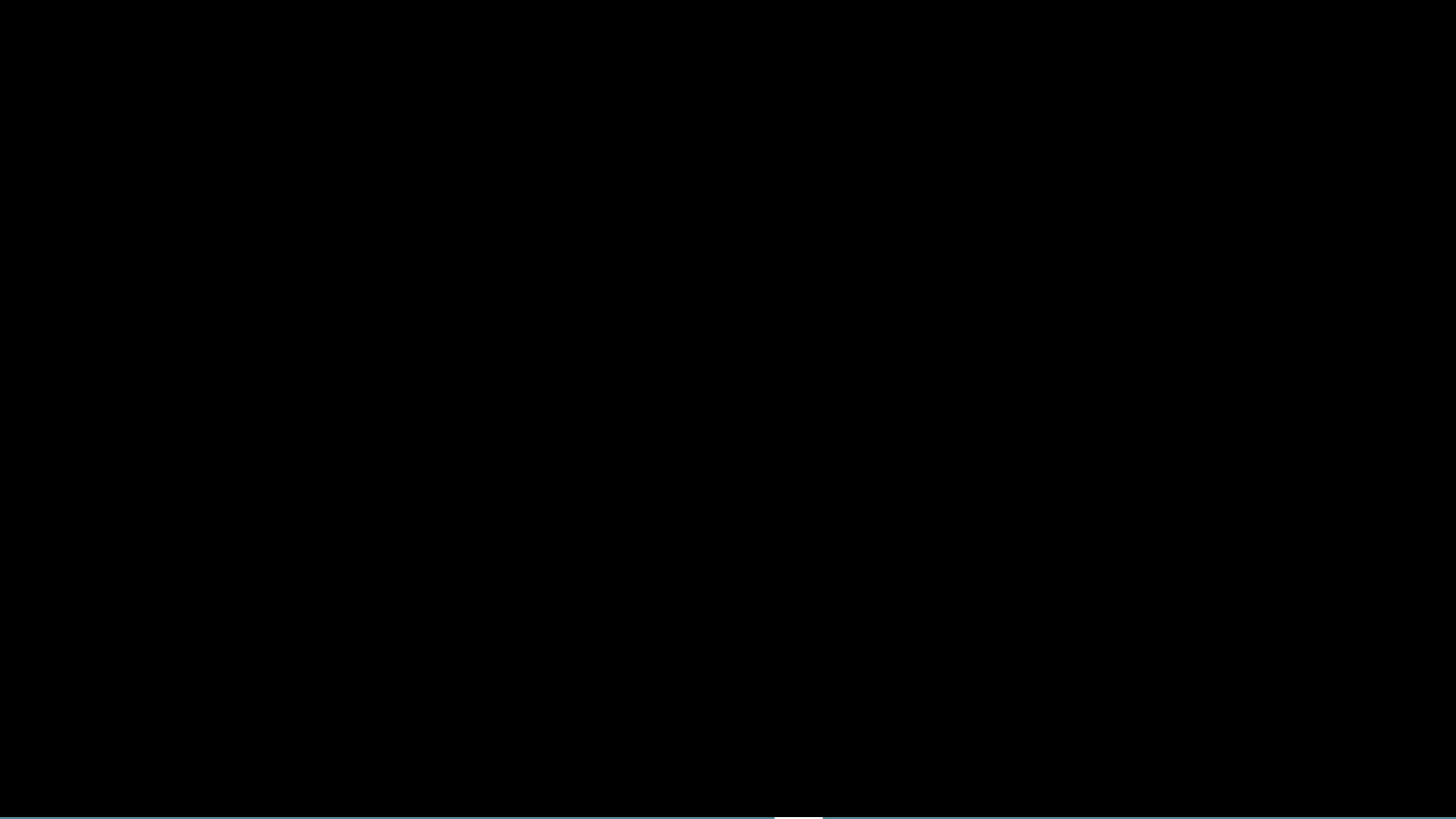
Ped2
Constant Call

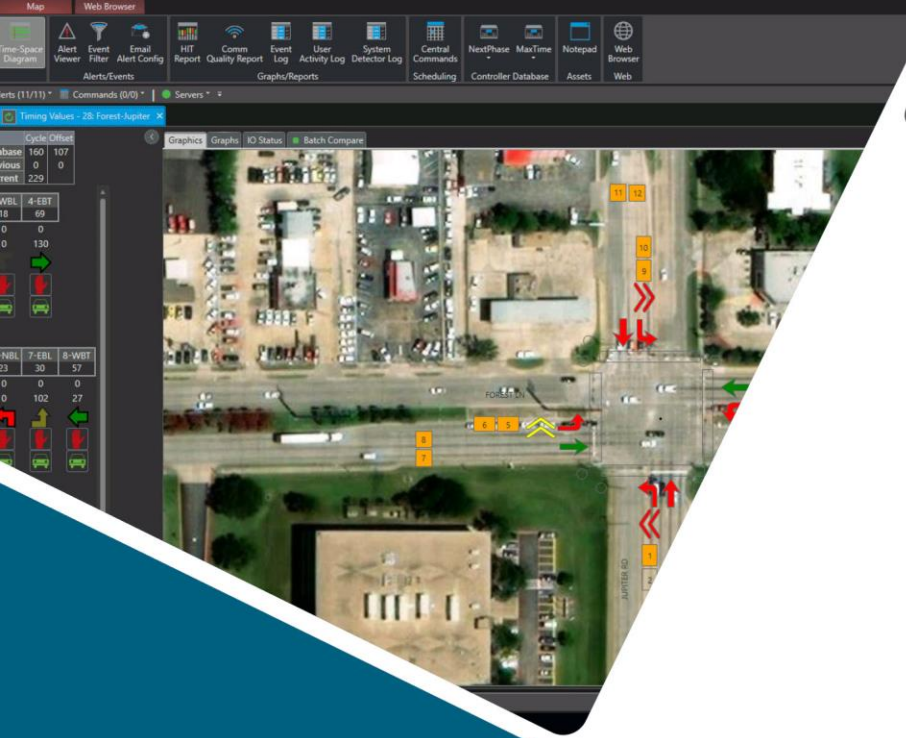
commQual: 95%

AoG
45%

Digital Assistants







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»»Kadence

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»»Traction

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»»Smart Priority

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