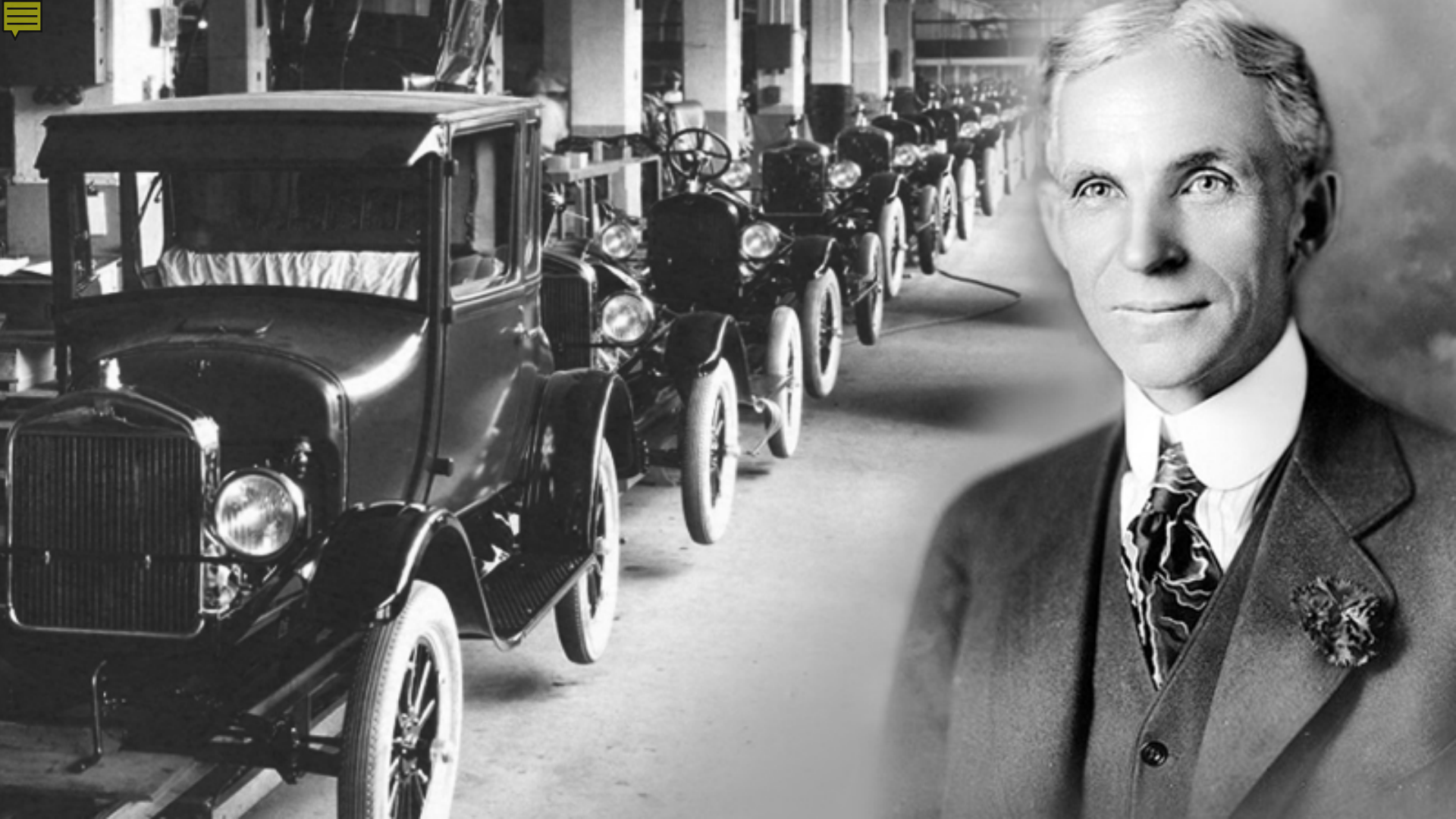
MIOVISION

Smart cities start here

Small but Mighty
Ingredients for Efficiencies in Small Communities

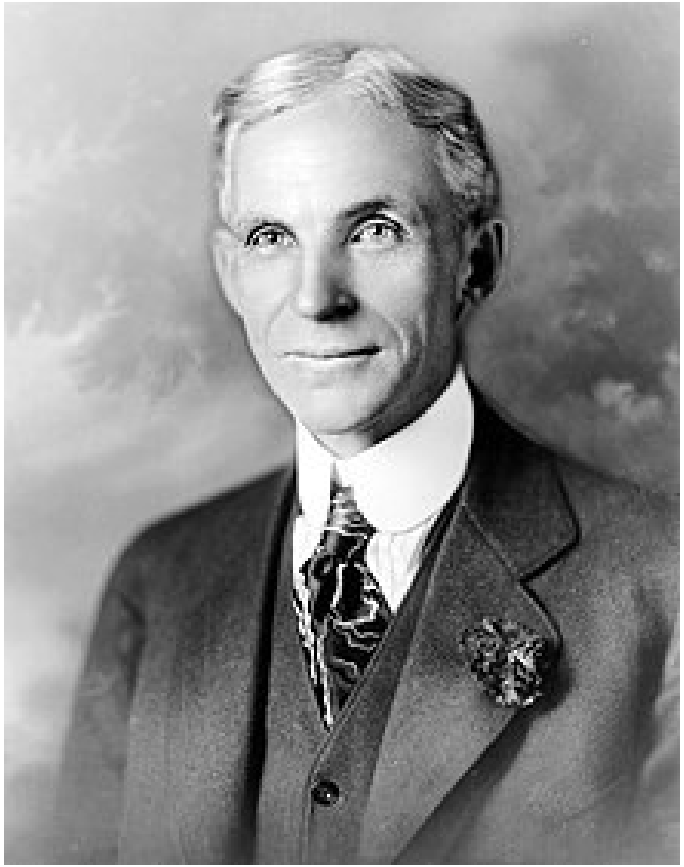


Henry Ford

He saw **a big problem** - and wanted to fix it with a reliable horseless carriage

Common Myth #1: Ford did NOT invent the car

Common Myth #2: Ford did NOT invent the assembly line



June 4th, 1896

"The Quadricycle"

58 Bagley Avenue, Detroit, Michigan

2018…

1,000,000,000+ Liters of Gasoline & Diesel

$1,000,000,000s spent in Infrastructure in America alone over the past century

95,000,000 Cars coming off assembly lines globally every single year

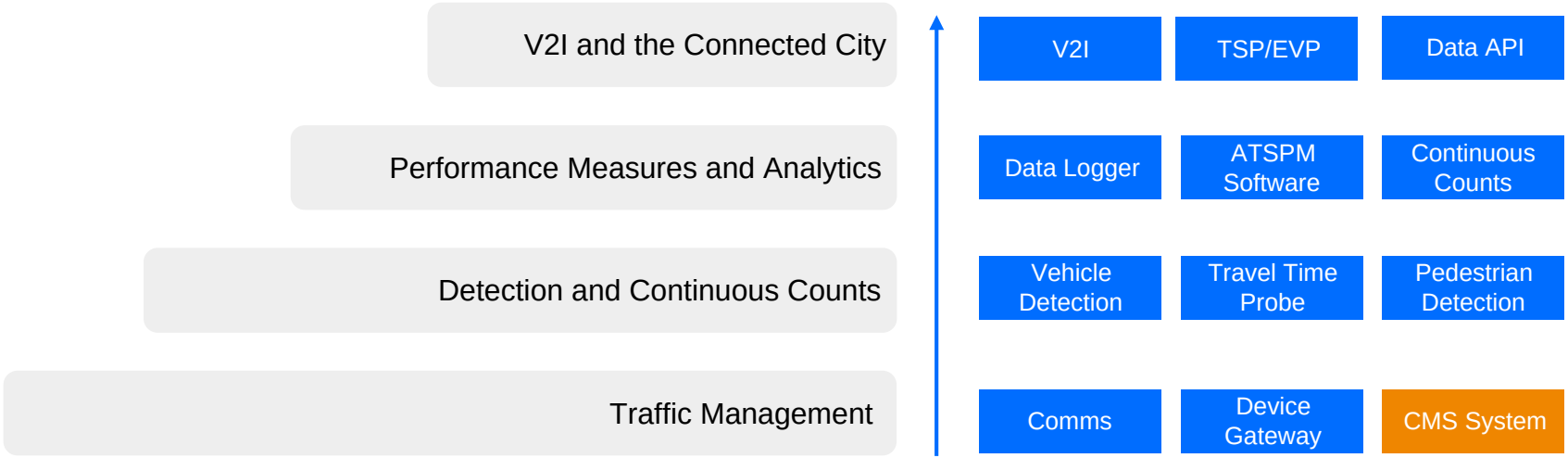
TRAFFIC MANAGEMENT PROBLEMS IN SMALLER CITIES

Key Themes I've Heard From Smaller City/County Agencies:

Small teams / Lack of staff Lack of time	Managing field technicians/contractors
At 20-50 signals, congestion appears in pockets	At around 50 signals, difficulty "keeping tabs" on infrastructure
Too busy "treading water" to improving traffic performance	IT complexity to connect and secure signal network

Small Detail: Budget

Building blocks of modern traffic operations



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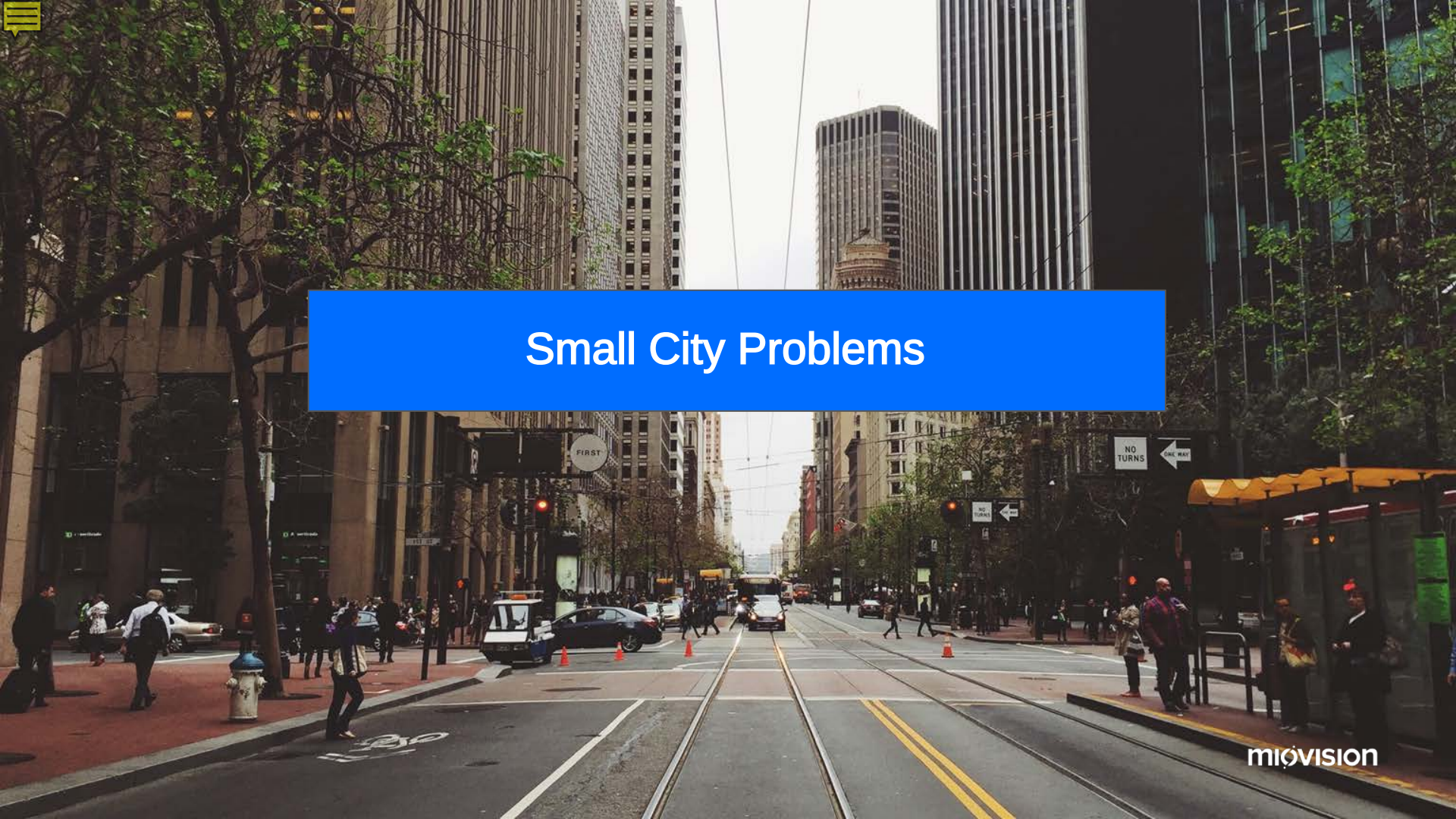
Small City Problems
FIRST
NO TURNS
ONE WAY
MIOVISION

The Key Questions “How do I solve this?”

Technical Logistics: “Is this even possible?”

- Need Communications
- Need Modern Controllers
- Need Intensive Data SecurityNeed Support from IT Department
- Need Implementation Consulting
- How do I use older technology with newer technology?
- I have to solve it all to even try this out

Who’s going to pay for & manage all of this?

Small Cities are dealing with...

- Limited Budgets
- Tight IT Restrictions
- Investments need to prove their worth immediately
- **Limited Time**

This leads to an even bigger problem…

Missed Opportunities

Smaller cities are spending their resources putting out ‘fires’ and keeping the lights on;instead of improvement & evolution.

Change happens

The industry as a whole is moving towards…

- ATSPMs/Continuous performance measurement to improve traffic
- Dynamic traffic control algorithms
- Data-driven safety improvements

Intersections needs to produce actionable data, and communication & detectoin is a key component in all of the above.

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Is there a solution?

SMALL CITIES CAN **DO IT BETTER**

"While I don't think smaller cities or towns should approach the Internet of Things or "smart cities" any differently than big cities, in practice their size will give them an advantage over their larger brethren"

Adrian McEwan, Author - Designing the Internet of Things

SMALL CITY **ADVANTAGE**

- Quicker results
- Smaller projects
- Lower Overall Costs
- More Autonomy
- Solution can grow with city
- Can leapfrog by starting at a blank slate

Miovision Solutions

Signal Communications

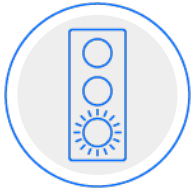
Monitor and manage your traffic signals remotely.

Traffic Studies

Portable and permanent traffic data collection for engineers and planners.

Traffic Project Analysis

Complete Traffic Impact Assessments and retiming projects quickly and easily.



Signal Maintenance

Find and rank issues, solve them, validate the fix, and communicate results internally.

Traffic Operations

Improve mobility and enhance performance of your network with data (ATSPMs).

Multimodal Detection

Use advanced traffic AI for presence detection and advanced analytics.

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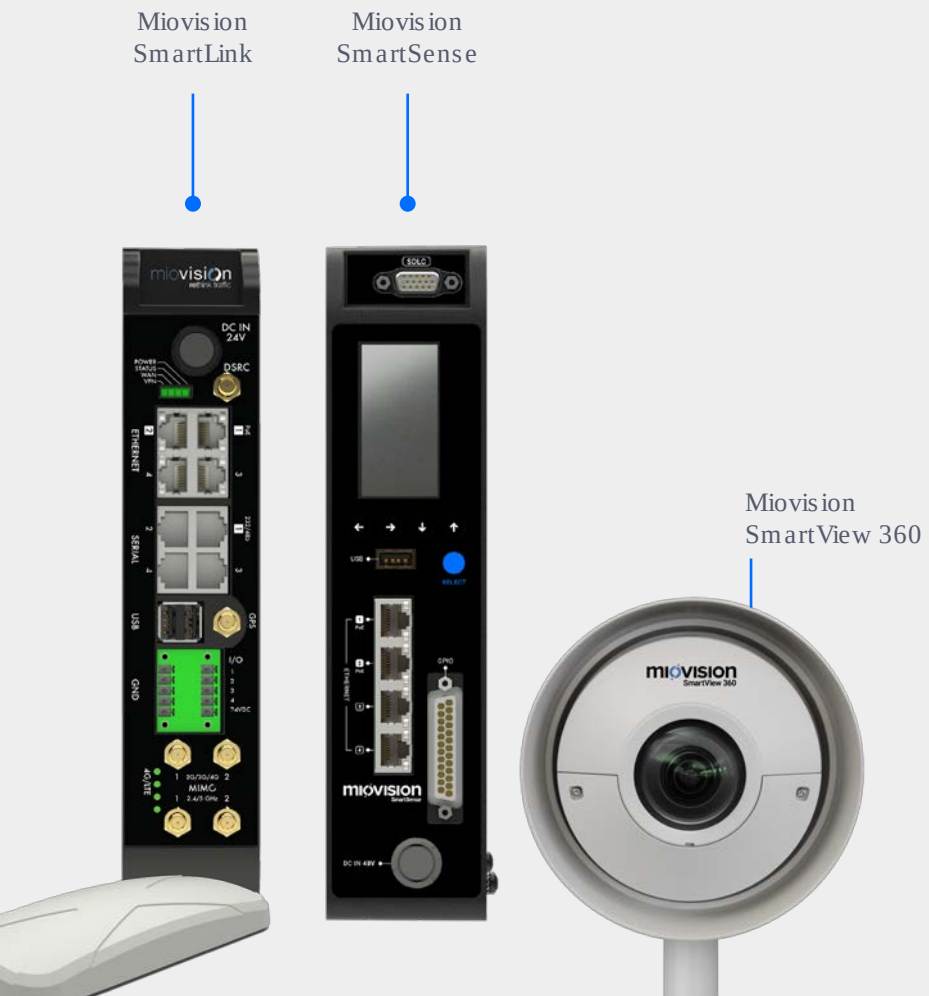


Many Problems : 1 Solution?

Minimize hardware Investments, Maximize Problem Solving

Miovision SmartLink

Remote access to everything in your cabinet via secure wireless communication.

Miovision SmartView 360

Captures an entire intersection from a single camera.
Generates video for monitoring, detection, and analytics.

Miovision SmartSense

Roadside video analysis to produce vehicle detection, traffic counts, and event alerts.

Miovision TrafficLink Portal

Cloud-based software suite for traffic operations.
A full open data API to integrate into all your systems.

CITY **OBJECTIVES**

SMARTERINTERSECTIONS SMARTER CITY

We develop to align with what all agencies are ultimately trying to solve for:

- Optimize Road Capacity
- Create a Safer City
- Reduce Emissions
- Improve Traffic Flow
- Make an Impact
- Keep it Easy

INGREDIENTS FOR EFFICIENCIES IN SMALL CITIES

THE ANATOMY OF SMART INTERSECTIONS

1. **CONNECTED**
   Enable remote diagnostics & monitoring
2. **COST EFFICIENT**
   Generate operational and capital savings
3. **INTELLIGENT**
   Analyze traffic data to reduce congestion and optimize flow of goods
4. **COMPATIBLE**
   Integrate seamlessly with existing infrastructure
5. **OPEN & INTEGRATED**
   Make traffic data securely available to all stakeholders
6. **FUTURE PROOF**
   Provide a hub for future smart city innovations

TRAFFIC MANAGEMENT IN **SMALLER CITIES**

- Compatible technology, avoid any “rip and replace”
- Secure LTE cellular
- Fully managed service
- Cloud-based monitoring software
- Alerts & Visibility to issues
- Video monitoring and video-based traffic studies
- Travel time monitoring
- Signal performance measures & easy to use ATSPMs


Small City Impacts
Food for thought
FIRST
NO TURNS
ONE WAY
MIOVISION

Cost Efficiency Barriers

Small teams / lack of staff
lack of time

At around 50 signals, congestion appearing in pockets

Too busy “treading water” to improving traffic performance

Managing maintenance staff/contractors

At around 50 signals, difficulty “keeping tabs” on infrastructure

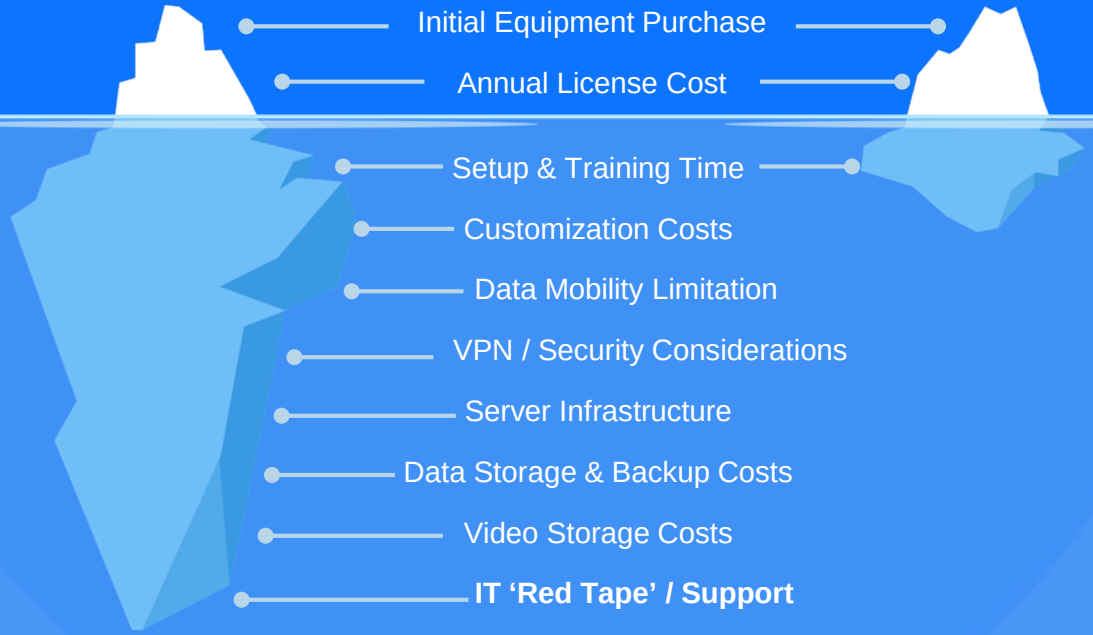
IT complexity to connect and secure signal network

Cloud vs. On-Premise Server Solutions

SERVER

CLOUD

A major consideration in software purchase decisions is critically the human element and resources of the system.



Connected

Do you know what's happening at your intersections without having to ship over a tech just to see if your lights are on flash or if you have faulty wires?

How much windshield time are false calls taking without having to get the local PD or Fire department involved?

SOLVING EQUIPMENT ISSUES IN **A FRACTION OF THE TIME**

Region of Waterloo (Ontario)
A small maintenance team has made solving infrastructure issues challenging.

Complex detector problems were often being unsolved for months.

Scenario:
Heavily utilized industrial park with an auto manufacturer

Complaints:
High volumes of customer complaints related to detector not performing at minor street

Technicians performed site visits multiple time, tested intersection equipment, but no issues were identified.

SOLVING EQUIPMENT ISSUES IN **A FRACTION OF THE TIME**

Investigation:

Installed TrafficLink units along corridor.

Within days, TrafficLink generated a malfunction log that detailed the intermittent failure of a specific loop detector.

Malfunctions log cross-referenced with complaints timeline.

Resolution:

Technician was able to immediately locate a malfunctioning detector

Within 2 hours of the TrafficLink analysis being generated, the team had diagnosed the issue, implemented an interim fix and generated a work-order.

Smarter tools can be used to offset the limitations of a small maintenance team.

"I checked the road loop and found worn thru loop wire in the center run.

When any 2 of the 4 center wires short out it can would short out one side of the loop causing a dead zone.

This type of failure would have been difficult to find without the Miovision analysis reports"

- City Technician

Intelligent

How do you give your city engineers, academic or engineering firm partners the right kind of data and enable a continuous feedback loop to make sure you're really providing a measurable difference to your citizens?

USING PERFORMANCE MEASURES TO **DIAGNOSE TRAFFIC ISSUES**

Northampton, MA
State operated rural signals.

Isolated, suburban, semi-actuated intersection near an elementary school and middle school.

Scenario:
Heavy complaints from parents about minor-street delays at school AM drop-off and PM pick-ups.

Challenge:
Staff shortage made it challenging to diagnose and solve issue through traditional observation.

massDOT
Massachusetts Department of Transportation

SMALLER AGENCY
CASE STUDY #2

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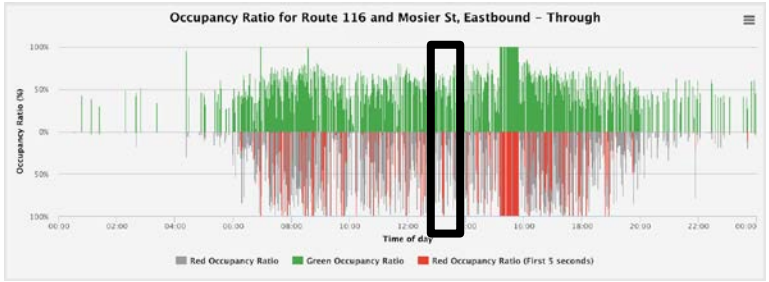
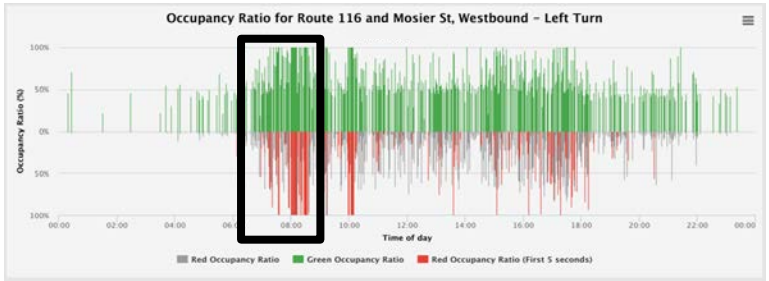
USING PERFORMANCE MEASURES TO **DIAGNOSE TRAFFIC ISSUES**

Identifying root of complaints using Occupancy Ratio analysis.



EB
swath of split failures between 3:10 PM to 3:50 PM



WB
consistent split failures between 7:20AM to 8:30AM

USING PERFORMANCE MEASURES TO **DIAGNOSE TRAFFIC ISSUES**

Developing a solution using data analysis results.

Move from a single timing pattern

Add two new patterns for AM and PM peaks
Use existing plan as base point

New AM Timing Plan

Run between 7:00 AM and 9:00 AM
Allocate more green time to minor movements

New PM Timing Plan

Run between 2:30 PM and 4:00 PM
Allocate more green time to minor movements
Reduce minimum green time on WB LT

massDOT
Massachusetts Department of Transportation

SMALLER AGENCY
CASE STUDY #2

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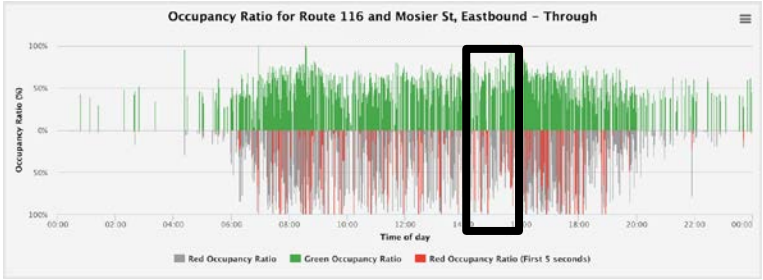
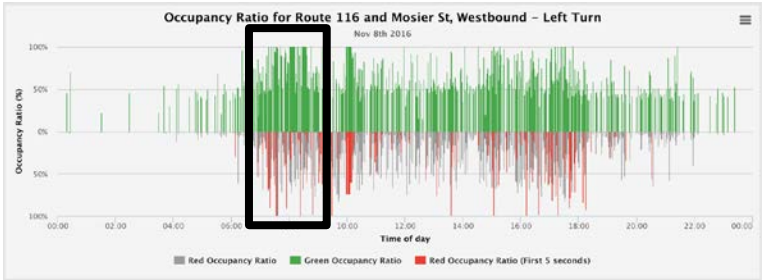
USING PERFORMANCE MEASURES TO **DIAGNOSE TRAFFIC ISSUES**

Instant verification of the solution's impact.



EB
Reduction in split failures during PM



WB
Fewer split failures during AM

USING PERFORMANCE MEASURES TO **DIAGNOSE TRAFFIC ISSUES**

City was able to quickly optimize this intersection by leveraging data from their existing infrastructure- rather than kicking off a bigger data collection and retiming effort.

Identify Issues

TrafficLink tools quantified the when/where/what

Used data to validate citizen complaints

Design Solution

Agency identified minor changes that could result in major improvements

Monitor Changes

Compare data before and after timing changes

Performance measures can be used to solve traffic issue more quickly and efficiently

Compatibility & Open Data

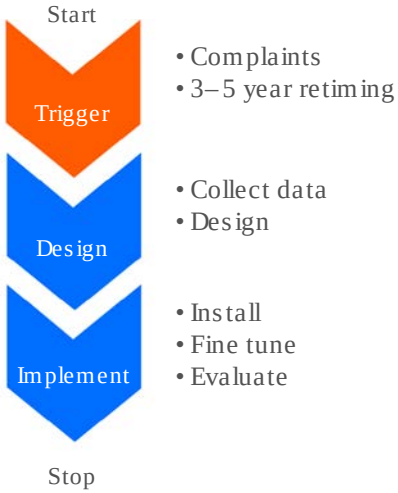
Both goes hand in hand; but generally the first refers to hardware and the latter refers to Software.

Are you able to consolidate easily cross-reference your data across systems/agencies/partners?

Small cities need to be able to do this very easily.

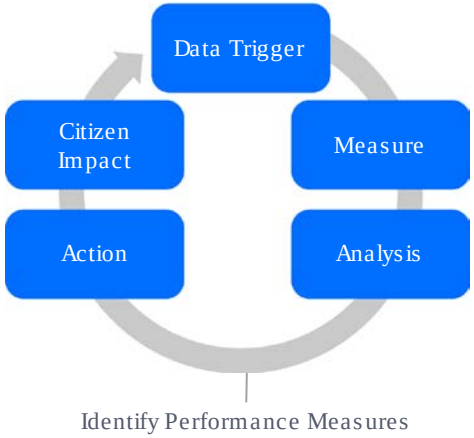
An evolution in traffic signal management

Traditional / Reactive



VS

Continuous / Proactive



Source: FHWA

Model a lot and measure a little

What gets measured gets done

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SIGNAL RETIMINGS AND **QUANTIFYING IMPACT**

Virginia State DOT (Multiple small cities across the state)

Team aware that corridors require re-timing and coordination, but signals on key corridors being “installed and forgotten”.

Obstacles:

Lack resources to do regular traffic studies
Lack tools to easily re-time and co-ordinate
Lack ability to measure impact.

End Result:

Corridors not being optimized as frequently as required.
Lack of insight into whether re-timings produce good ROI.
Lack of data to backup funding requests.

TRAFFICLINK 4 STEP SOLUTION

1. **Identify**
   Tools to easily visualize where traffic patterns have changed.

2. **Study**
   Generate on-demand video-based traffic studies with a single click

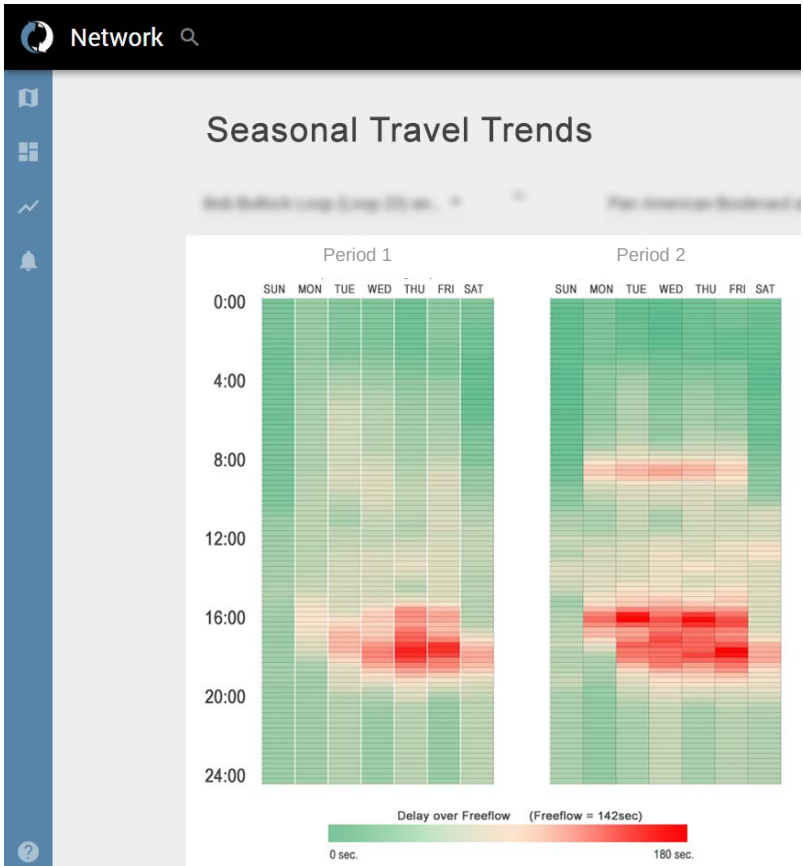
3. **Update**
   Remote signal connectivity to easily deploy plan changes

4. **Measure**
   Performance measures to quantify the impact of changes

1 IDENTIFY

TrafficLink Travel Time Trend Analysis used to automatically identify **shifts in traffic since last re - timing.**

Priority dashboards used to highlight hidden trends for users.



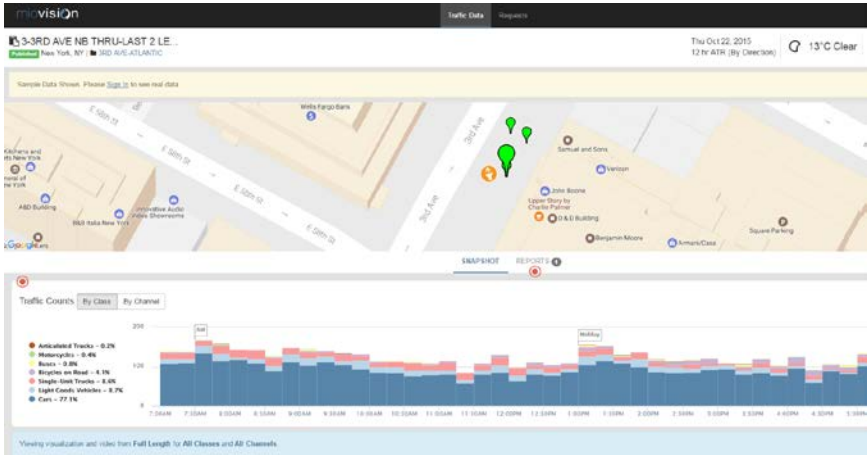
2 STUDY

Traffic Study:

With the click of a button, City can request video based traffic study at any time from our SmartView 360 Camera.

Turning movement counts with classification, including bike and pedestrian.

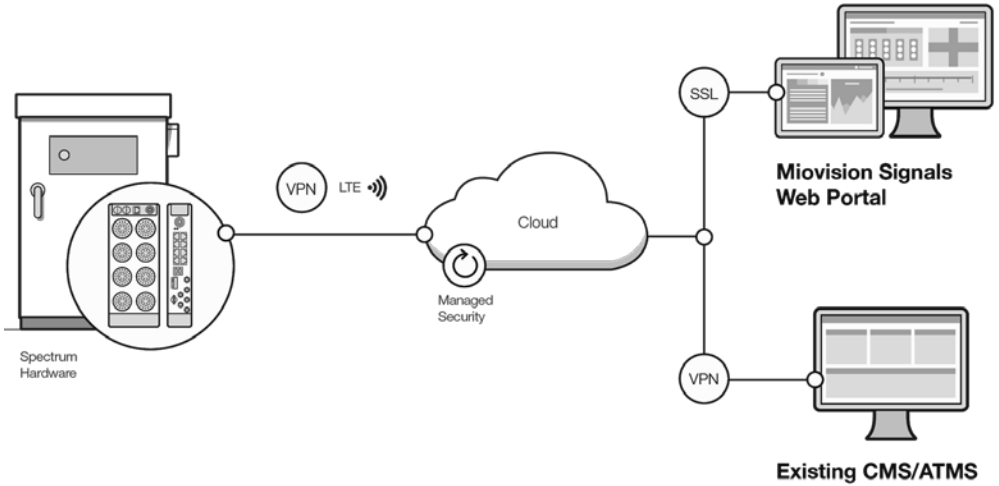
Cost, complexity, and time to generate required traffic studies greatly reduced.



3 UPDATE

Remotely deploy timing plans

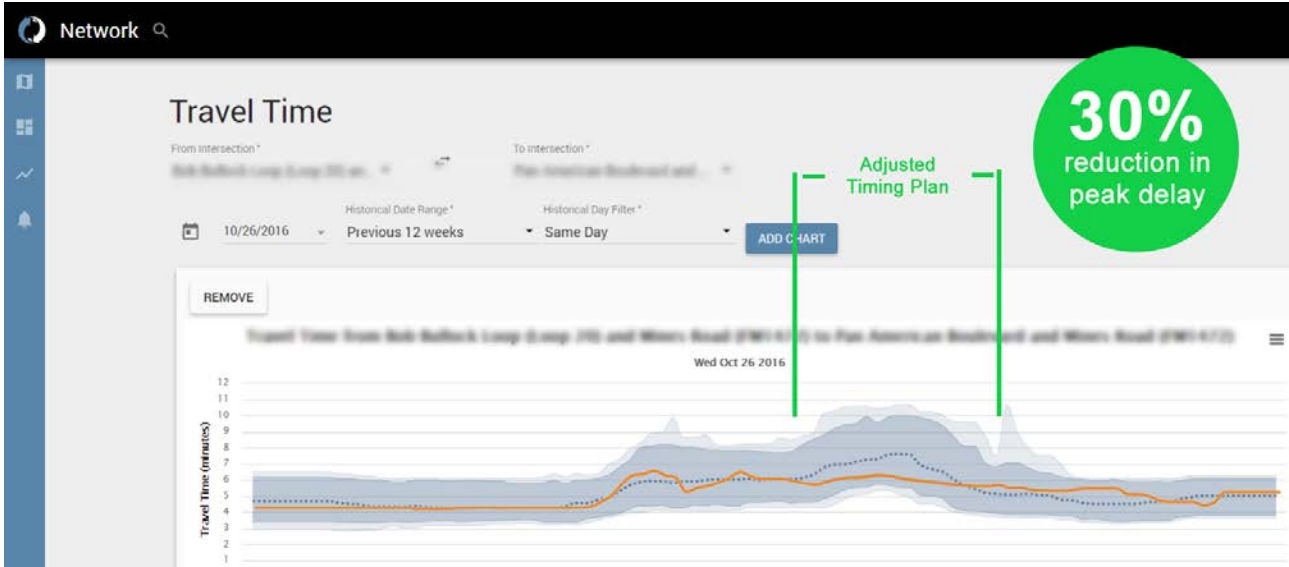
Secure communications integrate to existing CMS/ATMS, as well as TrafficLink web portal.



4 MEASURE

Smarter tools can allow agencies to more regularly and effectively re-time and coordinate signals

Measurable Results:
City can instantly verify the impact of changes and calculate the ROI.
Using this to drive funding requests for additional project investments.



Future-Proof

Small City investments need to last; but technology moves very quickly with minimal costs.

How do you adapt?

Partner with a vendor who recognizes solving problems relies on partnerships with other forward thinking organizations.

Miovision TrafficLink

More than just detection - a full suite of solutions from a single camera

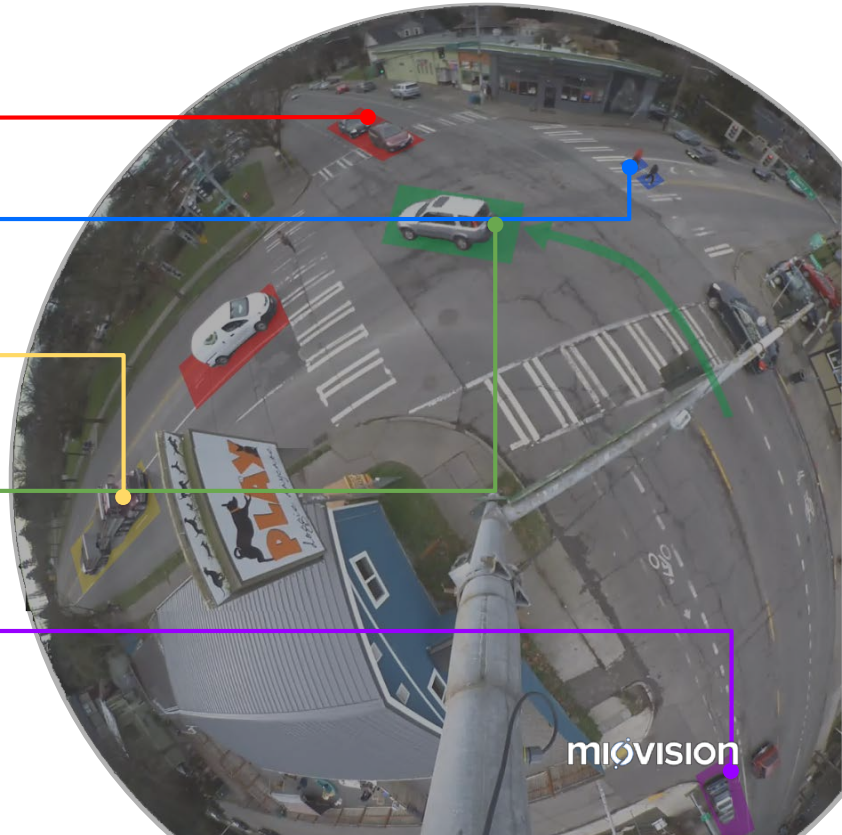
Vehicle detection
Improve traffic control with full actuation

Complete streets
Build complete streets strategies by understanding pedestrian patterns

Traffic classification
Better planning with counts and classifications of vehicle types

Continuous Counts
Optimize engineering work with automated turning movement studies

Event detection
A smart city platform that can detect parking violations, safety hazards, traffic incidents, and more.



Miovision TrafficLink

Achieving Vision Zero

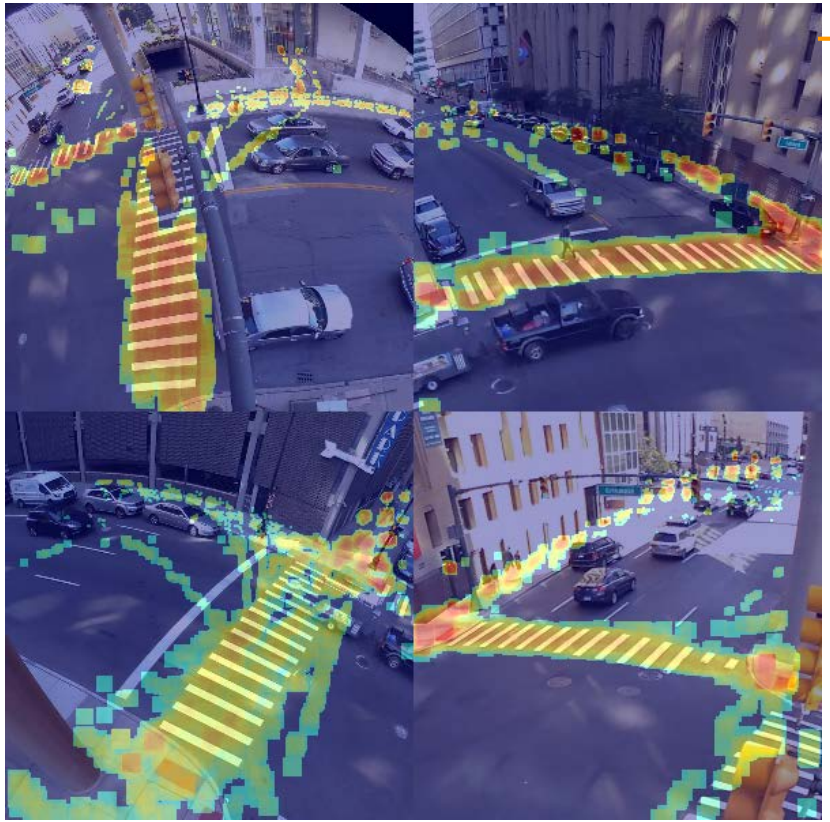
Lack of actionable data is the biggest barrier to improving safety. We are working to close that gap.

Predictive Safety Analytics:

- Identifies compliance hazards
- Profiles intersection traffic risks
- Near miss analysis

Predictive Safety Analytics

Pedestrian Compliance

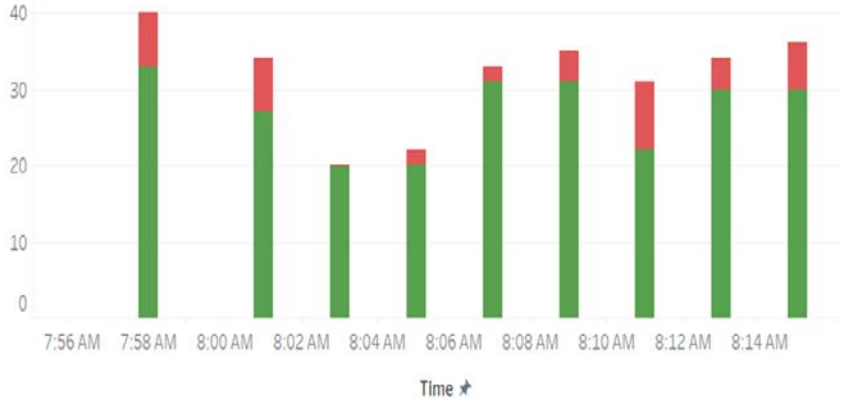


Spatial Compliance

Pedestrian Heatmap, Jaywalker %, etc.

Phase Compliance

Walking on *Walk* and *FDW* Signal vs. *Don't Walk*



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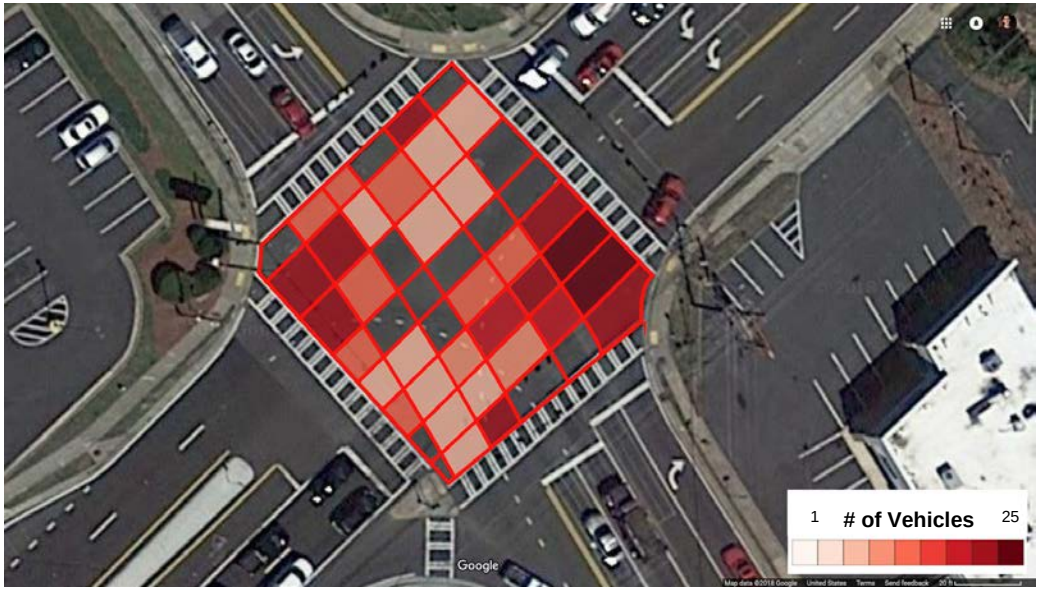
Predictive Safety Analytics

‘Red Zone’ Occupancy or Anonymized Red Light Running Data

Vehicles within the ‘Red Zone’ is generally okay when traffic is moving through it.

However safety concerns can arise from two conditions:

Vehicles remaining within the ‘red zone’ during yellow or red can cause potential conflicts.



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Predictive Safety Analytics

Near-Miss Analysis

Aka. near-miss analysis, this data describes when, where, and how critical near-misses between vehicles, pedestrians, and bikes occur, and how often they occur.

Miovision is currently working with our research team and third-party partners to work toward a conflict analysis solution.

This deeper analysis could be more targeted and prioritized if utilizing the other safety metrics first.

Smart Intersection Countermeasures

Connected Vehicle Alerts

Personal Safety Messages via DSRC

Leveraging Video Analytics technology, warn connected vehicles about the presence and location of vulnerable road-users within a cross-walk, around the corner, or in an intersection.

Roadside Alerts via DSRC

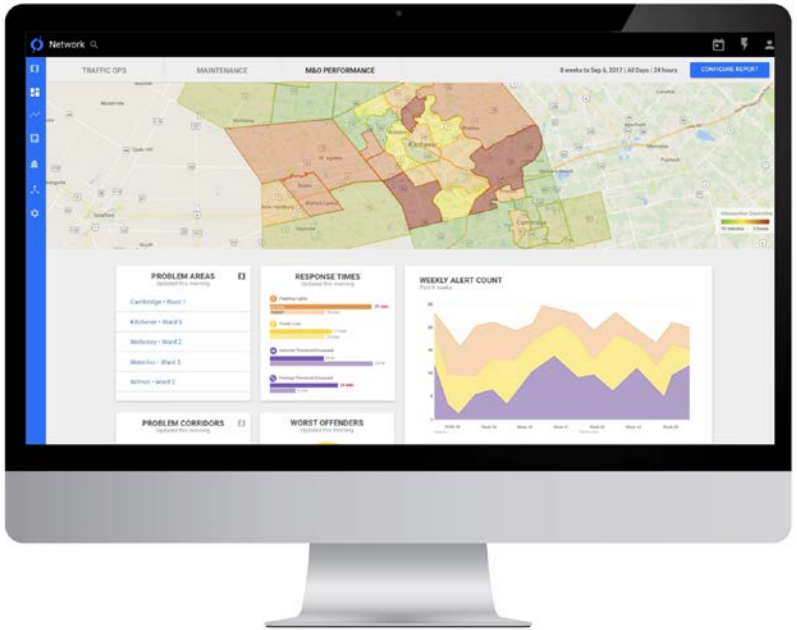
Warn connected vehicle drivers of potential hazards, poor road conditions, public safety issues, or infrastructure malfunctions via Roadside Alerts.

Miovision TrafficLink

Small Cities Are Mighty

Invest in technology that will allow you to solve multiple problems simultaneously.

TrafficLink Portal



SmartLink SmartSense

SmartView 360

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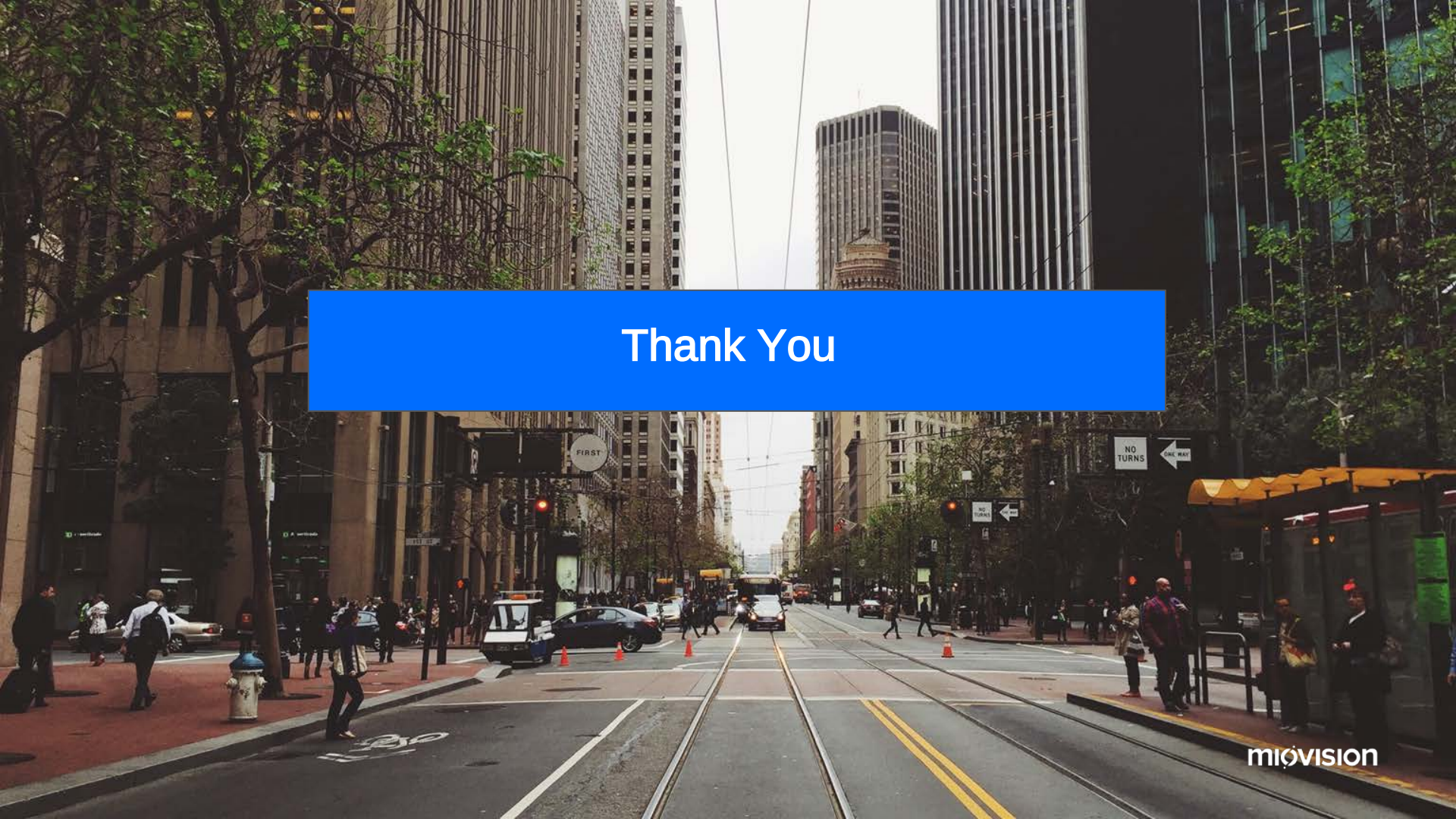
Thank You
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