



# Connecting signals to vehicles for Eco-approach and departure applications

A ten-year review of practices,  
achievements, challenges and  
outlook in North America

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Presentation at ITS Washington Annual Meeting  
November 2024



# Our Journey

In 2005, Miovision® set out to change the way traffic data was collected. By integrating real-time and historical traffic data with advanced analytics, it has become a leading provider of ITS solutions.

Miovision empowers cities and transportation agencies to make data-driven decisions, implement intelligent traffic signals and improve overall mobility for pedestrians, cyclists, and motorists.

With the acquisition of TTS, Miovision redefines the landscape of telematics and shapes the future of V2X. Miovision's innovative connected vehicle technologies, such as Personal Signal Assistant®, support the groundbreaking Traffic Light Information [TLI] from Volkswagen Group, in service since 2016 and available in select VW brands.

# Ten-Year Look Back of TTS

The only commercially available platform for connected safety and mobility solutions worldwide



2013  
Founded



40+  
Full Time Employees



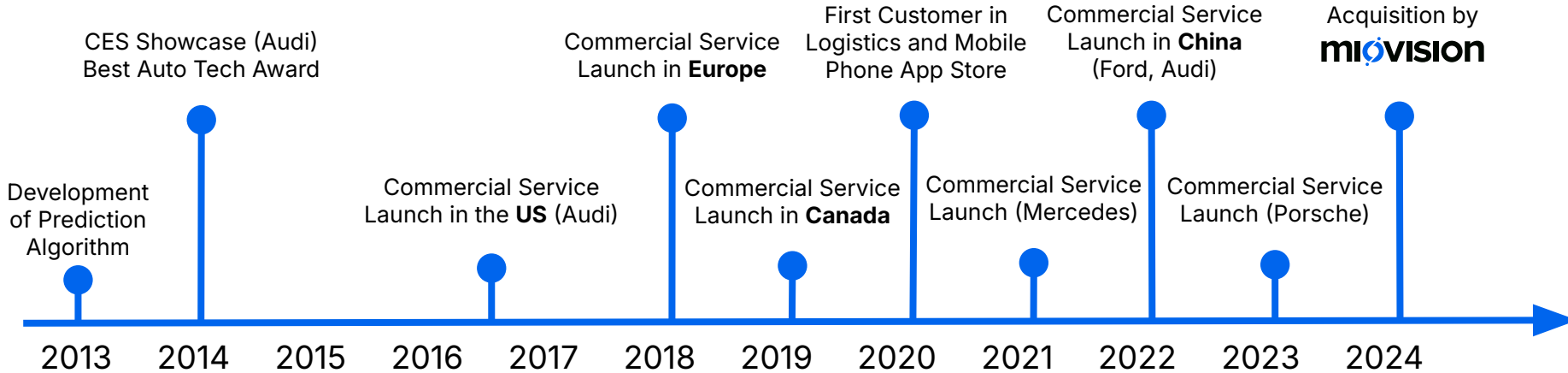
9  
Patent Families



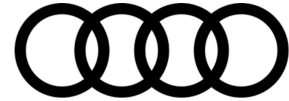
3  
Major Markets (NA, EU, CN)



1.5+ Million  
vehicles equipped



# We Helped Introduce...



Youtube: <https://youtu.be/ZfobcXcOA3E>

And...



Youtube: [https://youtu.be/CggXSu\\_P2GQ](https://youtu.be/CggXSu_P2GQ)

# And...



BENTLEY

Youtube: [https://youtu.be/wL8\\_frS13GM](https://youtu.be/wL8_frS13GM)

# And....



L I N C O L N

Video available upon request

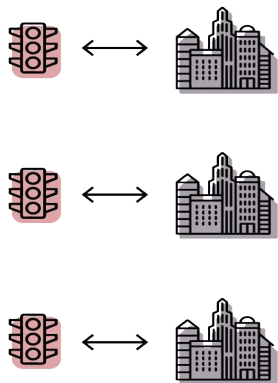
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# Cloud-Based V2X Service

**Personal Signal Assistant<sup>®</sup> as the platform between infrastructure and vehicle end users**

## Traffic Agencies

Data generation



## Personal Signal Assistant<sup>®</sup>

Data processing, prediction, mapping, technology stack & support services

DATA EXCHANGE

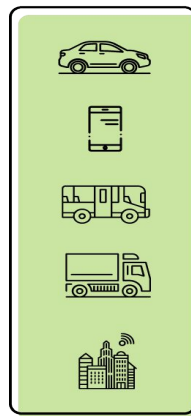
DATA EXCHANGE

DATA EXCHANGE



## B2B Customers

Development of end-user applications / systems



## End Users/Apps

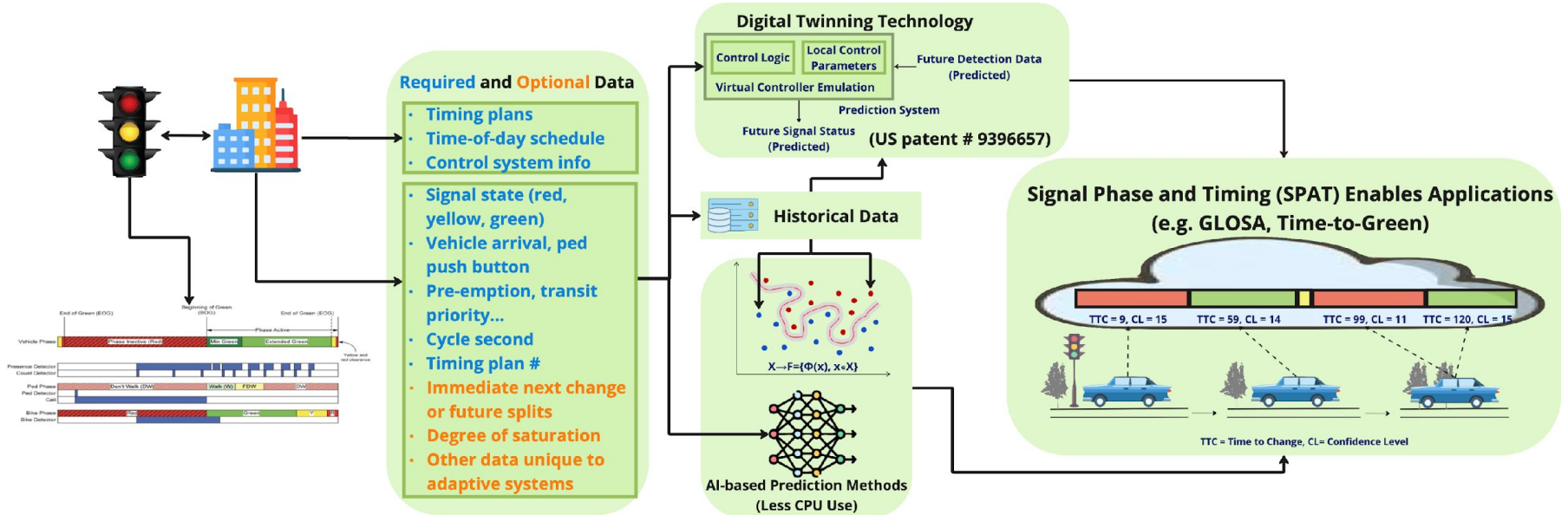
Usage of end-user applications / systems





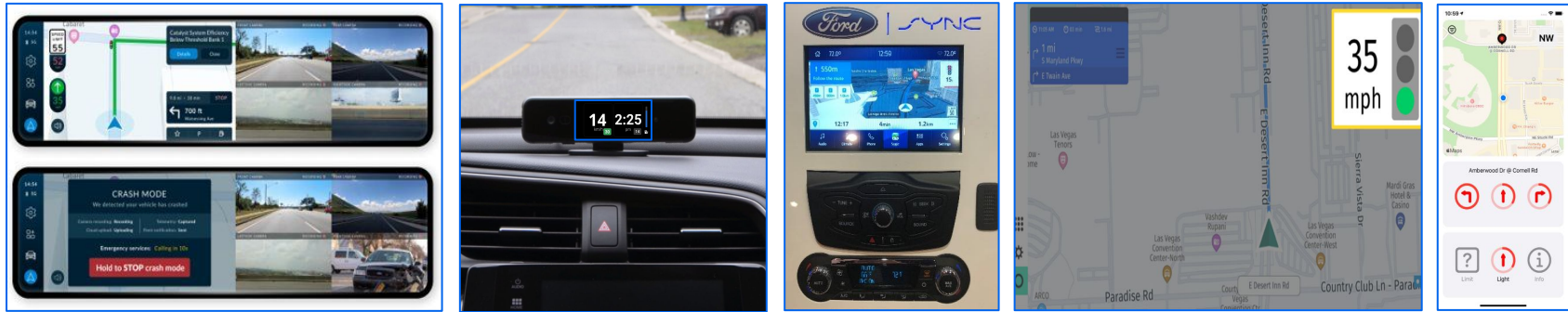
# SPAT: Signal State Change Predictions

Various algorithms co-exist for predictions, including patented emulation-based and artificial intelligence methods



# After-Market Solution Providers Integrating TTS Services

Aftermarket devices/navigation providers can assist current car owners with V2I services



In the aftermarket device and navigation service providers, TTS clients include many renowned multinational corporations as well as start-ups. Service and devices can be easily sold worldwide to include V2I as add-on

City of Ottawa, Canada and Dallas region, Texas sponsor such services to freight and courier services

verizon

here

graphmasters  
collaborative routing



CONNEX2X

Sygie



TELENAV

Ottawa

miOVISION

# NCTCOG - Freight Optimization

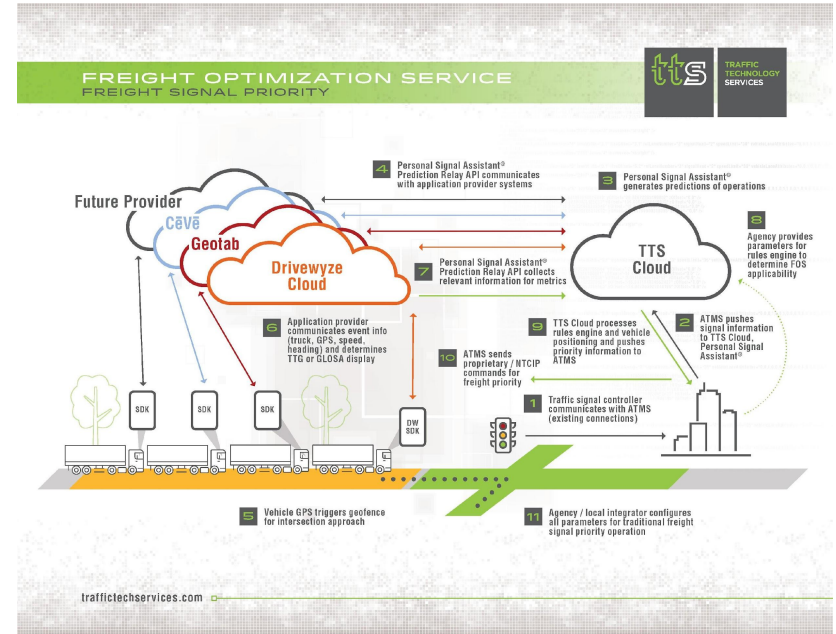
## Spearheading into serving freight industry by eco-approach and departure applications and virtual detection

A consortium led by Kimley-Horn Associates to provide freight signal priority services throughout the Dallas-Ft Worth metro area for a period of 6 years.

Personal Signal Assistant® **EcoDrive™** app will be focus of technology for GLOSA applications

EcoDrive™ app will provide **real-time feedback** to Kimley-Horn systems for active freight signal priority operations.

Additional agency suppliers should contribute interfaces to support this NCTCOG funded project.



# User Benefits: Improved Comfort and Safety

## What drivers say

I think the feature is pretty badass myself... I'm sure we've all sat at lights wondering when the hell it was going to change. This would relief some of that anxiety.

If they integrate it with the start-stop system, I think it would be very useful.

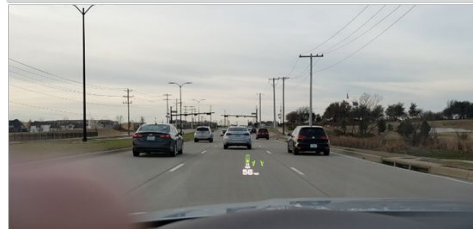
I could actually use this because we have lots of stop light cameras here and I've gotten a couple of red light violations.

I am actually impressed at some of the programming behind it...

Also I was able to use the recommended speed to catch green lights. This worked every time... Definitely wish this feature was more wide spread.

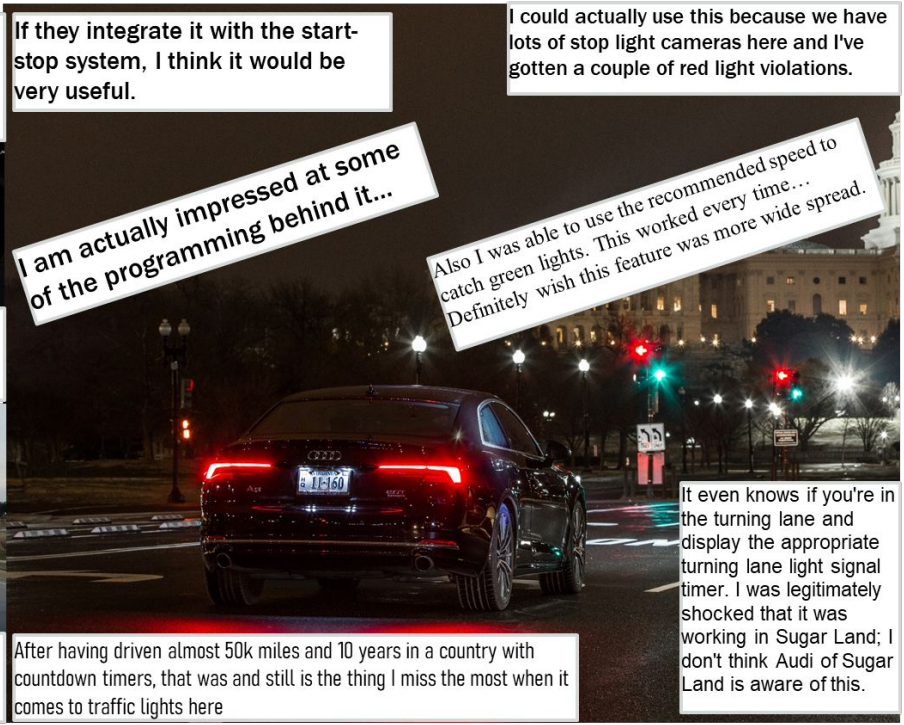


I live in the DFW area and we have it around frisco. Hell they have the updated green light feature also. These are from my car:

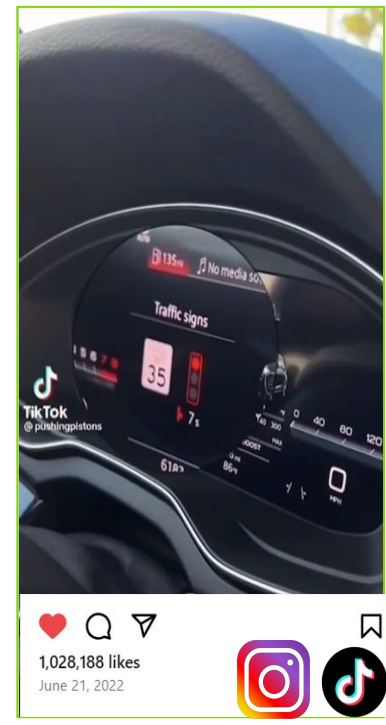


I've always wondered why they can't integration ACC with the traffic light info. It'd be great if it can stop at a red light for me...

After having driven almost 50k miles and 10 years in a country with countdown timers, that was and still is the thing I miss the most when it comes to traffic lights here

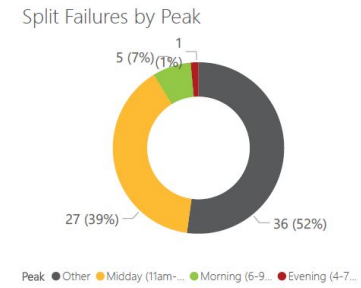
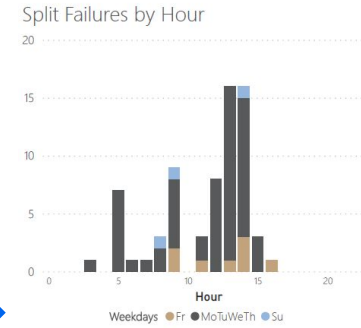
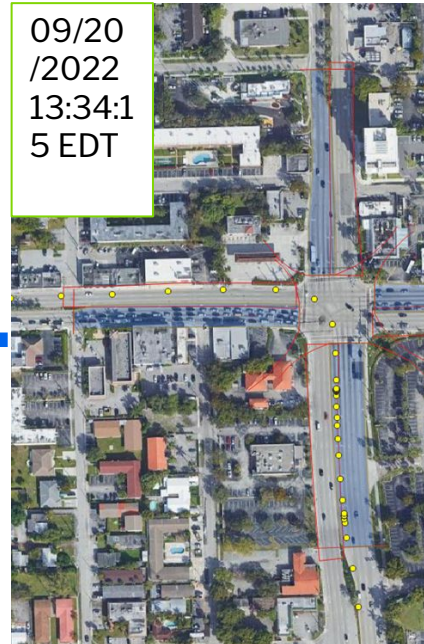
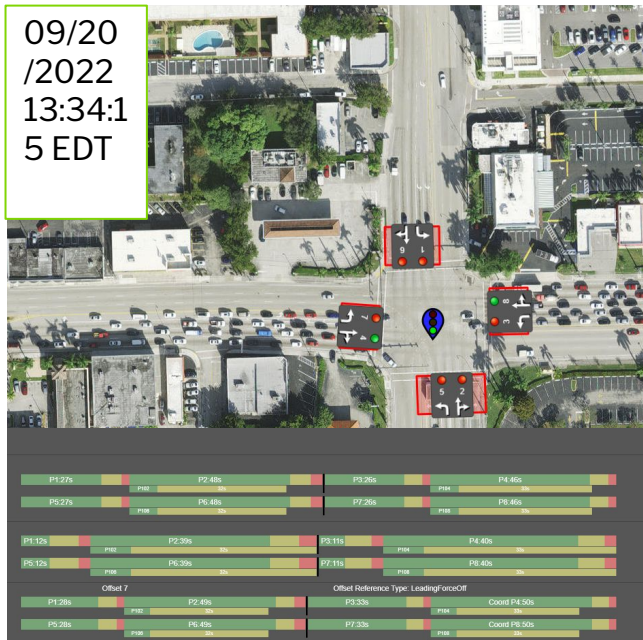


It even knows if you're in the turning lane and display the appropriate turning lane light signal timer. I was legitimately shocked that it was working in Sugar Land; I don't think Audi of Sugar Land is aware of this.



# Operator Benefits: Intersection Intelligence

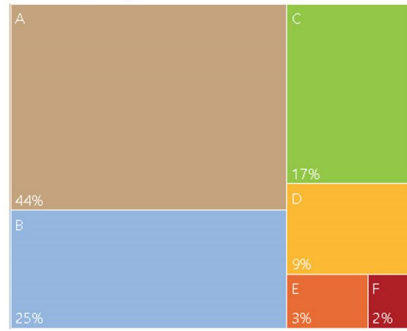
Time-synchronized traffic signal and connected vehicle data power in-depth intersection performance KPI



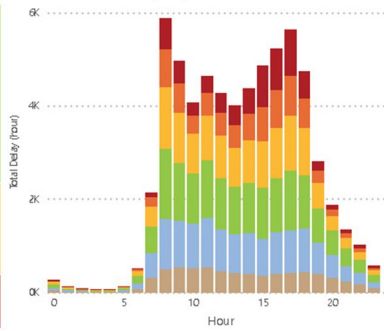
# Sample Deployment Report

Such report is periodically (weekly or monthly) delivered to IOOs, as part of the data sharing agreement

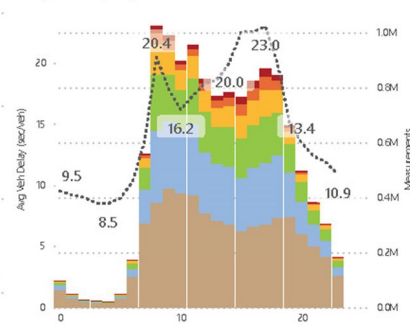
LOS Crossings



Fleet Total Delay by Hour



Avg Delay by Hour

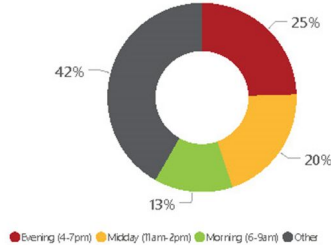


Crossings  
**12,710,349**  
Intersections  
**1,875**  
Fleet Total Delay  
**63.4K**

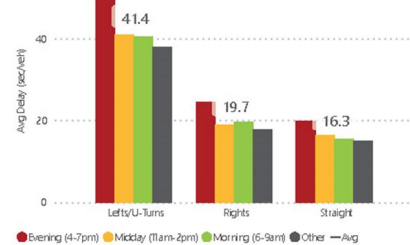


Average Delay  
**18.0**  
Morning Peak  
**17.2**  
Midday Peak  
**18.0**  
Evening Peak  
**21.8**  
All Other  
**16.5**

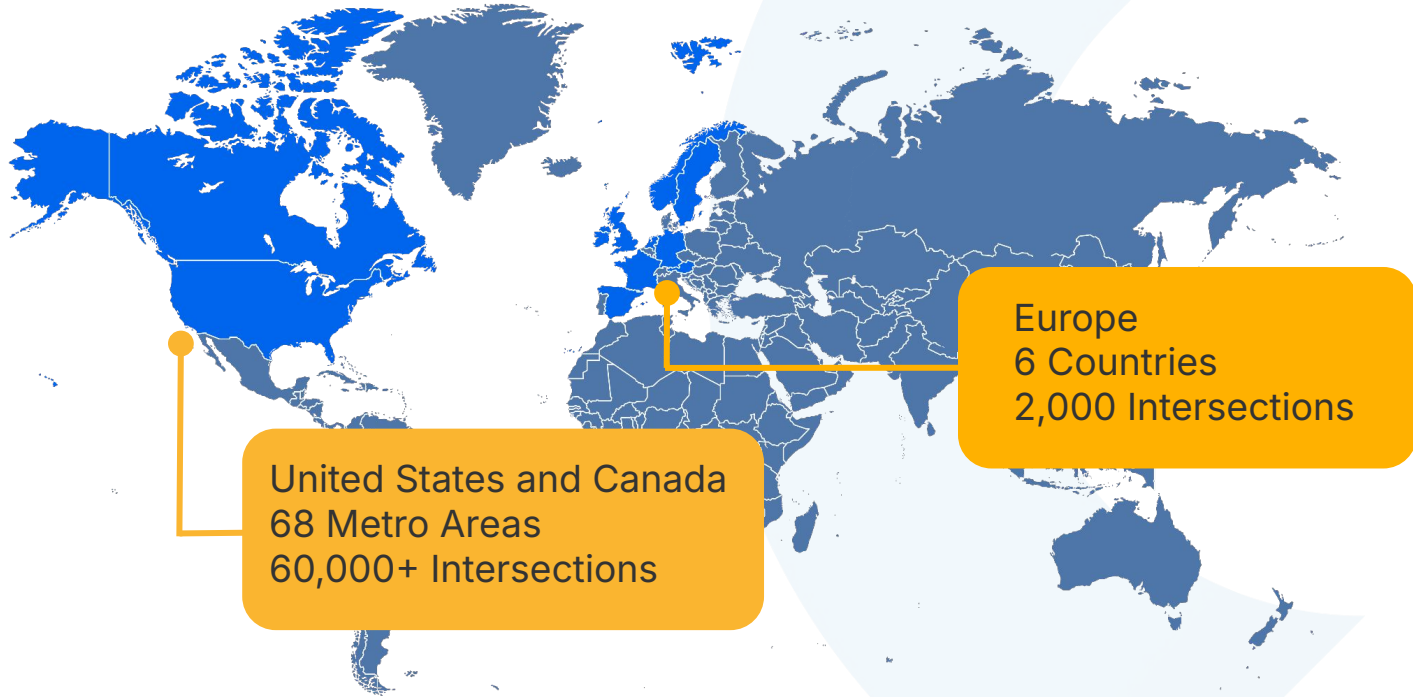
Fleet Total Delay by Peak



Avg Delay by Peak/Movement



# MAP & SPAT Coverage as of May 2024



Miovision is a global leader in traffic data that helps cities plan and manage mobility, helping cars drive safer and more efficiently.



2+ Trillion  
SPAT delivered



30+ Billion  
vehicles counted



1.5+ Billion  
pedestrians counted



23+ Million  
video hours analyzed



68 Countries  
utilizing Miovision solutions

## Miovision Deployment Network

- 9,000+ Detection and count locations
- 350+ Adaptive control locations
- 2,000+ Traffop locations
- 11,000+ Portable Scouts
- 95,000+ Preemption locations
- 70,000+ V2X service locations

## Miovision Partner network

- Smart City partnership with AWS
- Communications partner with TELUS



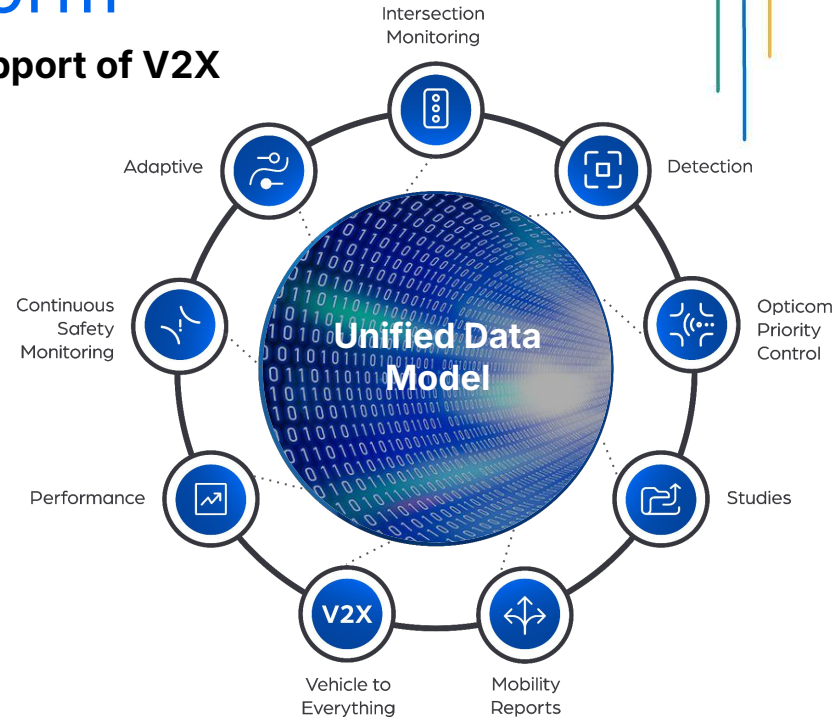
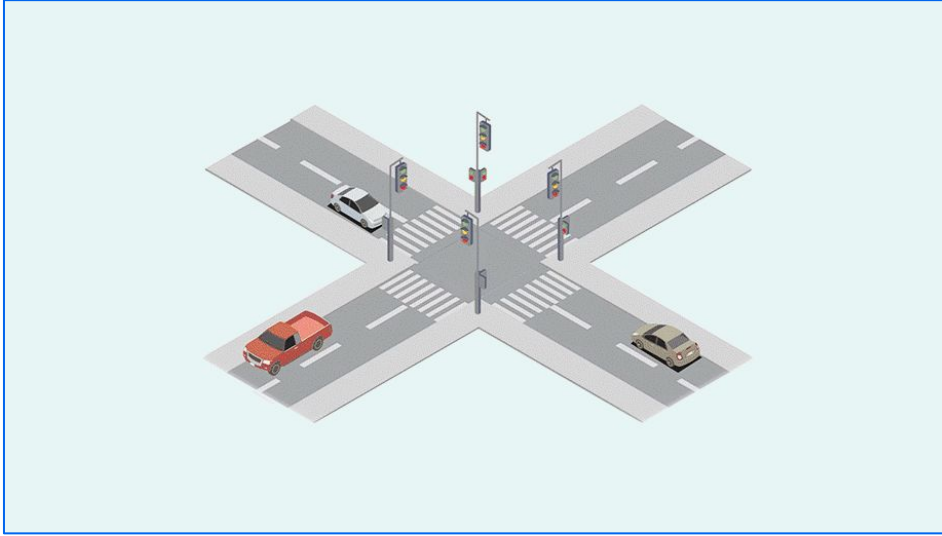
**miovision**



# Miovision's Integrated Platform

Unified platform as primary "system of record" in support of V2X

APPLICATIONS



PLATFORM

Real-time Monitoring

Alerts & Notifications

Device Management

Org & User Management

Security Management

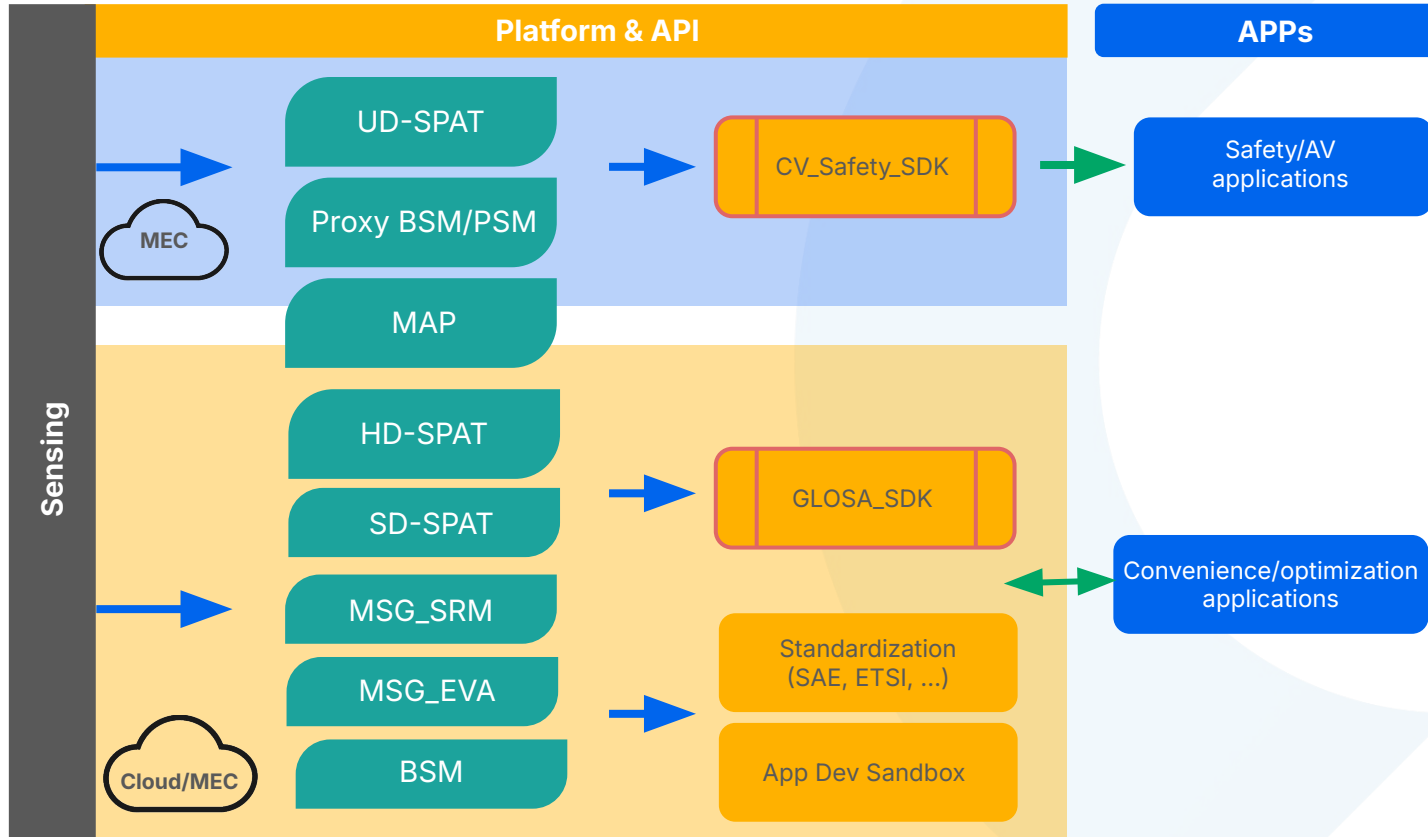
Data Management

App Management & Deployment

Location Configuration

Integrations & APIs

# V2X Platform and API Layer



# Personal Signal Assistant<sup>®</sup> Application Layer

Use cases are grouped into four distinct categories/bundles

## Convenience/Comfort



- Time-to-green
- Green light alert
- Green request confirmation

## Optimization



- GLOSA
- Personalized green light / Signal traverse optimization
- Traffic light informed routing
- Signal prioritization

## Safety



- Red-light violation warning
- Dilemma zone assist
- White alert
- Left-turn assist
- Emergency vehicle locator

## Autonomous



- True real-time signal state
- True real-time intersection proxy

# USDOT V2X Deployment Plan

## V2X Services accelerated deployment will benefit from public-private partnerships

Use cases covered by the USDOT plan are focused on Safety:

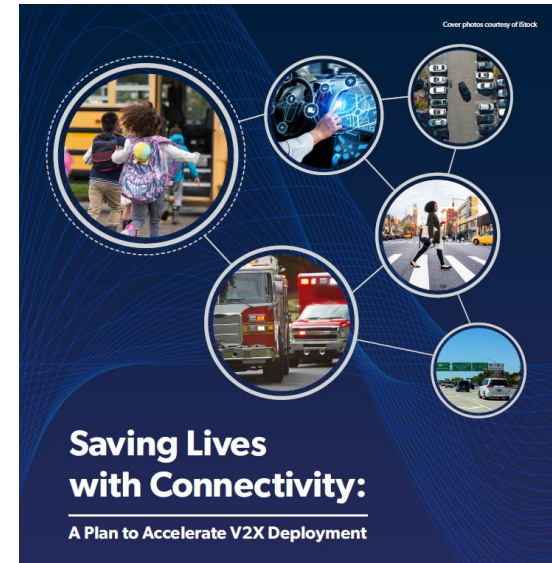
- White alert (VRU safety)
- Red-light violation warning
- Left-turn assist

⇒ These use cases to be sponsored and supported by government agencies

All other use cases are NOT covered by the USDOT plan, including:

- Time-to-green
- GLOSA
- other optimization applications

⇒ These use cases to be sponsored by active subscriptions from service providers such as Miovision



# White Alert - Concept

- Real-time, **collision risk detection and mitigation** system
- Finalist for the **2024 U.S. DOT Intersection Safety Challenge**
- Integrates three decision-making layers:
  - Sensing layer to track traffic
  - Decision layer to evaluate risk
  - Execution layer to trigger mitigation actions
- **Predicts and prevents potential collisions**, alerting both vehicles and pedestrians to avoid danger
- Sends **real-time alerts** that make a difference



# Why White Alert - 'California Crash'



Video available upon request

# High-level Architecture and Message Flow

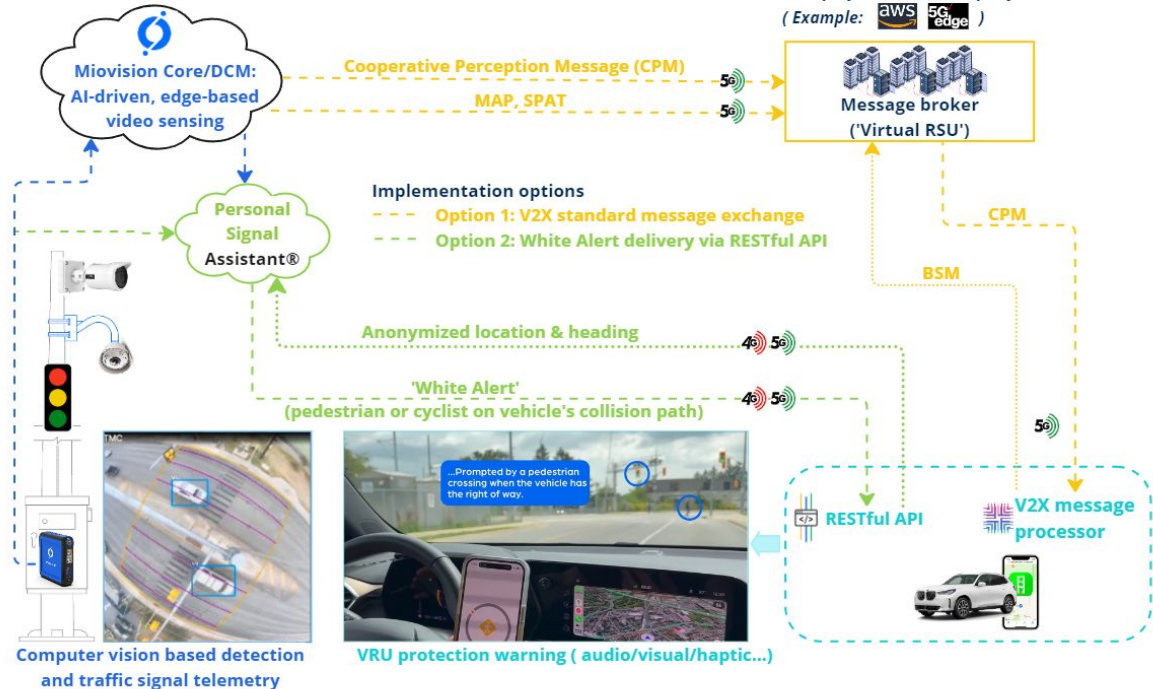
Miovision provides two implementation options: simplified RESTful API request/response, or virtual RSU-OBU applications; delivery via (5G slicing + MEC) or (cloud + public cellular)

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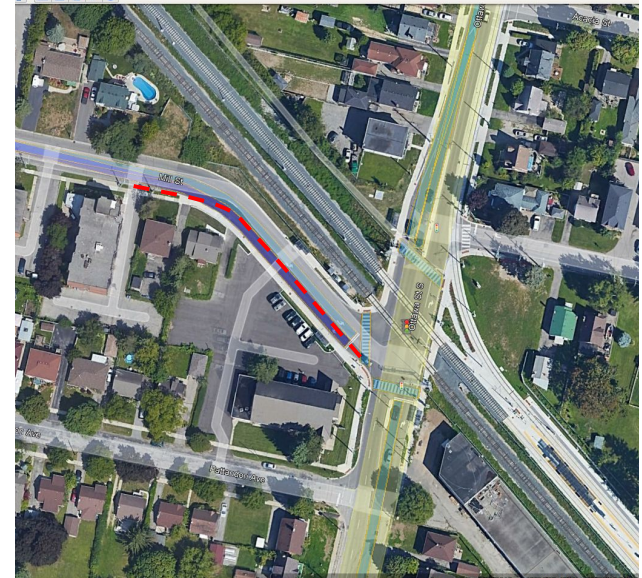
- 1) Simplified RESTful API
- 2) Virtual RSU

Note: vRSU provides two delivery options:

- a) 5G slicing + MEC
- b) Cloud + public cellular



# A Proof-of-Concept with a Phone App



Video available upon request



# miovision

# Thank you

Contact

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