Connected Truck Technologies and Applications

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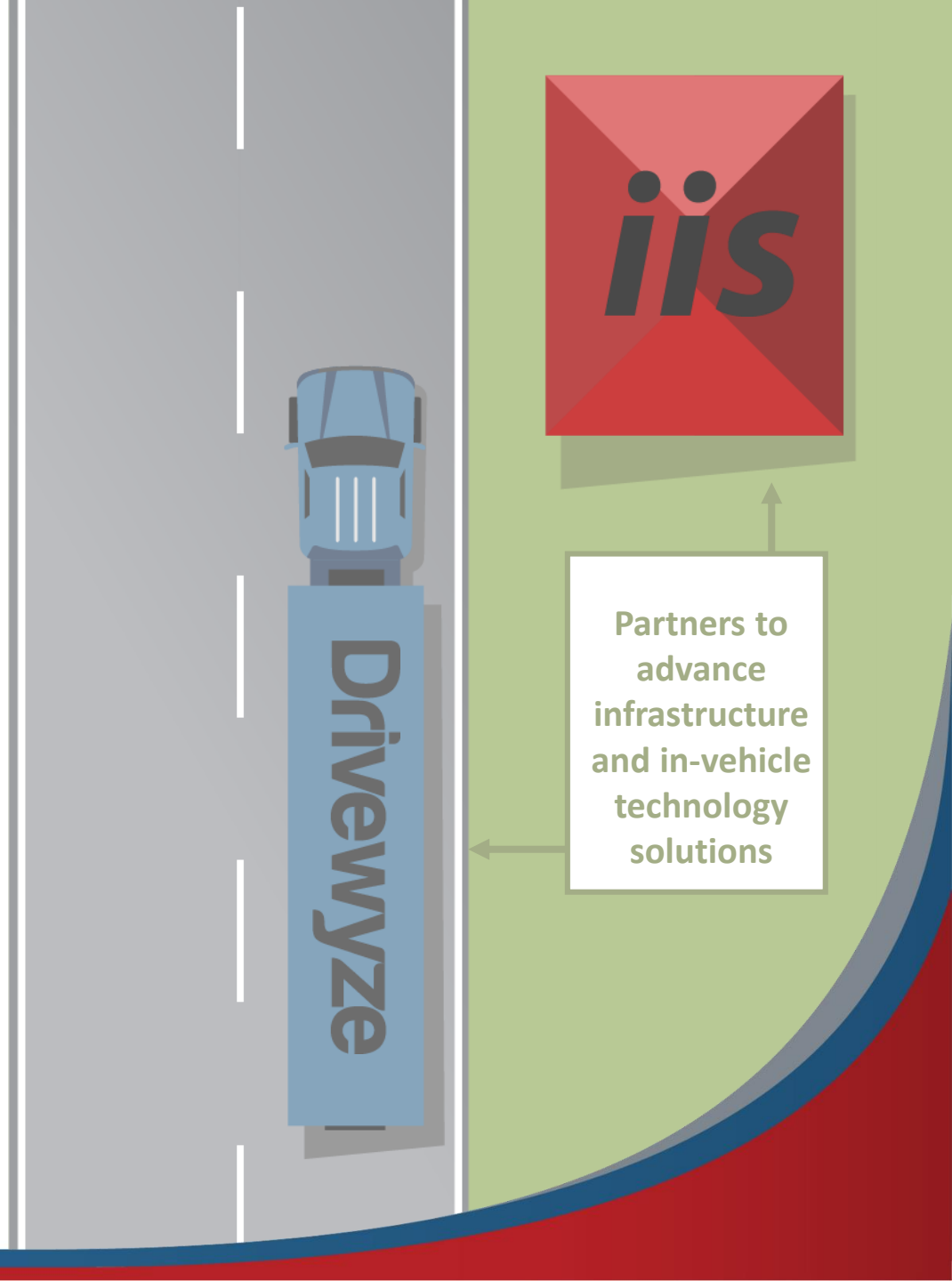
Who We Are

- **Intelligent Imaging Systems (IIS)** is an innovative developer of integrated hardware and software solutions to improve transportation safety & efficiency
- Market leader in truck parking availability systems and electronic screening systems for Commercial Vehicle Enforcement
- **Drivewyze** is a 100% owned subsidiary of IIS
- GPS-based connected vehicle platform delivers weigh station bypass services to Commercial Motor Vehicles (CMVs) across North America
- Connected truck platform deployed in over 1,600,000 trucks



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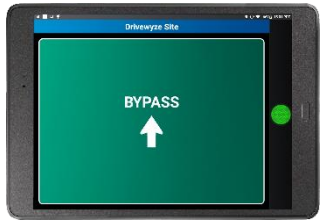
Our Technology

IIS Smart Roadside technology improves transportation safety & efficiency

- Advanced roadway sensor systems
- Most widely deployed Commercial Vehicle Enforcement screening platform in North America
- Truck parking availability systems

Drivewyze is North America's largest weigh station bypass network

- Infrastructure free, GPS-based, cross-platform software application
- Transponder free, no poles. In-cab mobile application + roadside compliance software
- Rewarding responsible carriers with bypass opportunities
- Largest single in-truck software deployment in trucking industry



Our Experience

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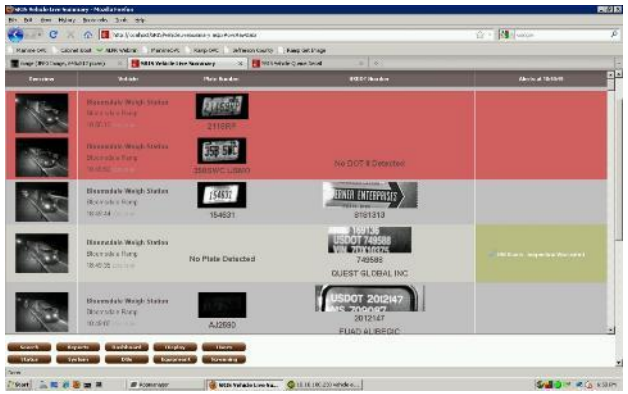
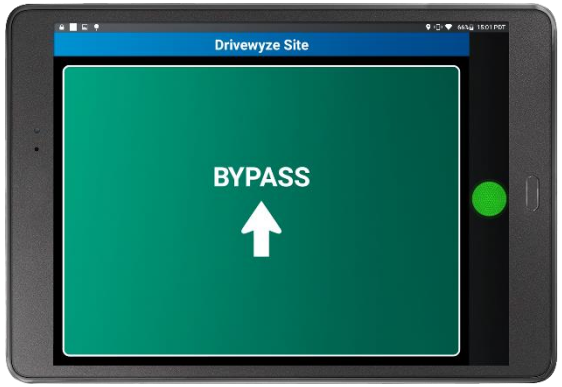




2003

IIS debuts as a thermal inspection technology provider

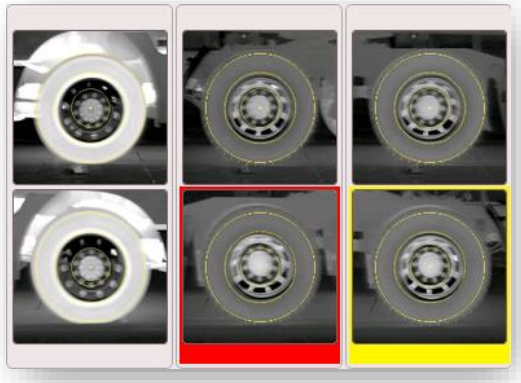
2009

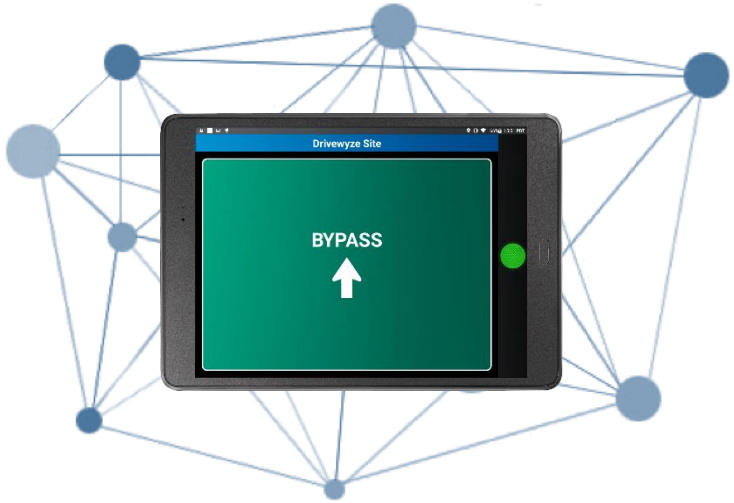
IIS sensor suite integrated into Smart Roadside software to centralize management of weigh station technologies

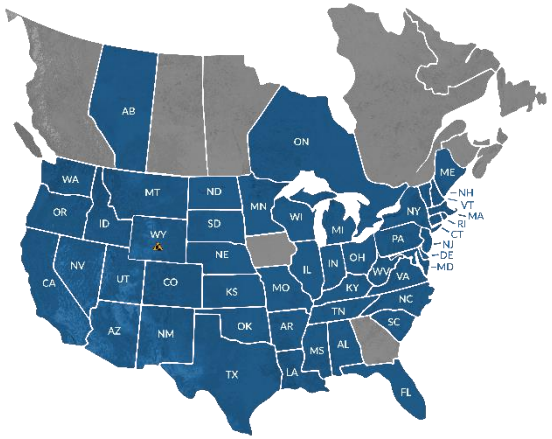
2013

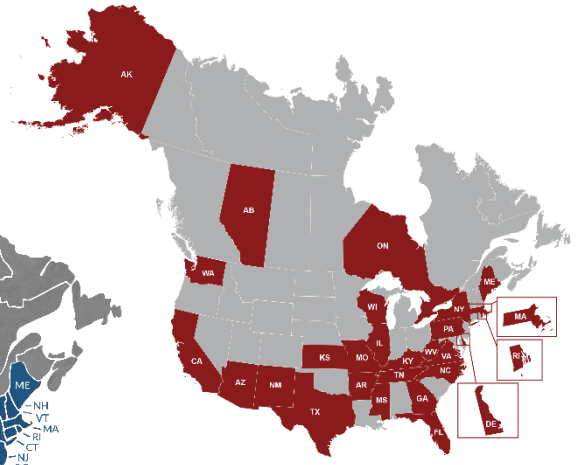
Drivewyze GPS-based weigh station bypass commercialized

Our Experience









2014

IIS automates thermal inspection, develops vehicle waveform ID

Drivewyze 1st telematics integration

2018

IIS deploys unified platform, truck parking systems

Drivewyze Partner devices in 1 of every 4 trucks on the road

Today

IIS 140+ Smart Roadside installations in 26 states

Drivewyze 800+ bypass service sites in 46 states

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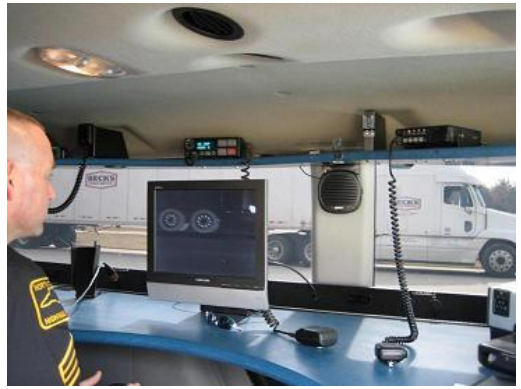
Our Experience I-81/Virginia

IIS is a longtime supplier and contractor to the Virginia DMV on Motor Carrier Service Centers (MCSC) – Weight and Inspection Stations throughout the state.

1. WIM/ALPR and other screening systems
2. Truck Bypass and Notification through Drivewyze
3. Mobile Thermal Screening Systems for truck screening



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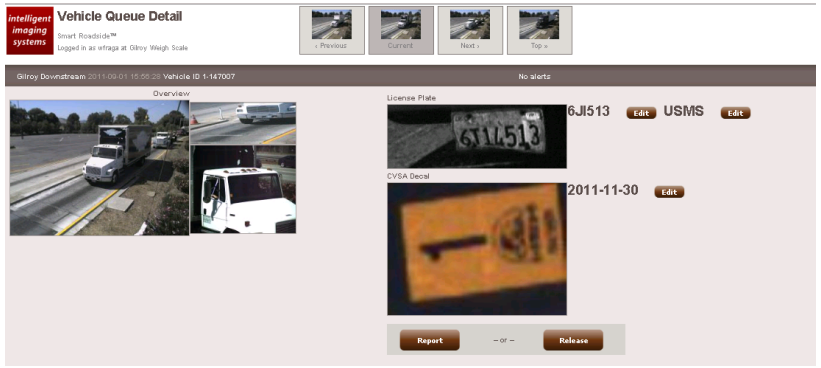
Our Experience I-81/Virginia



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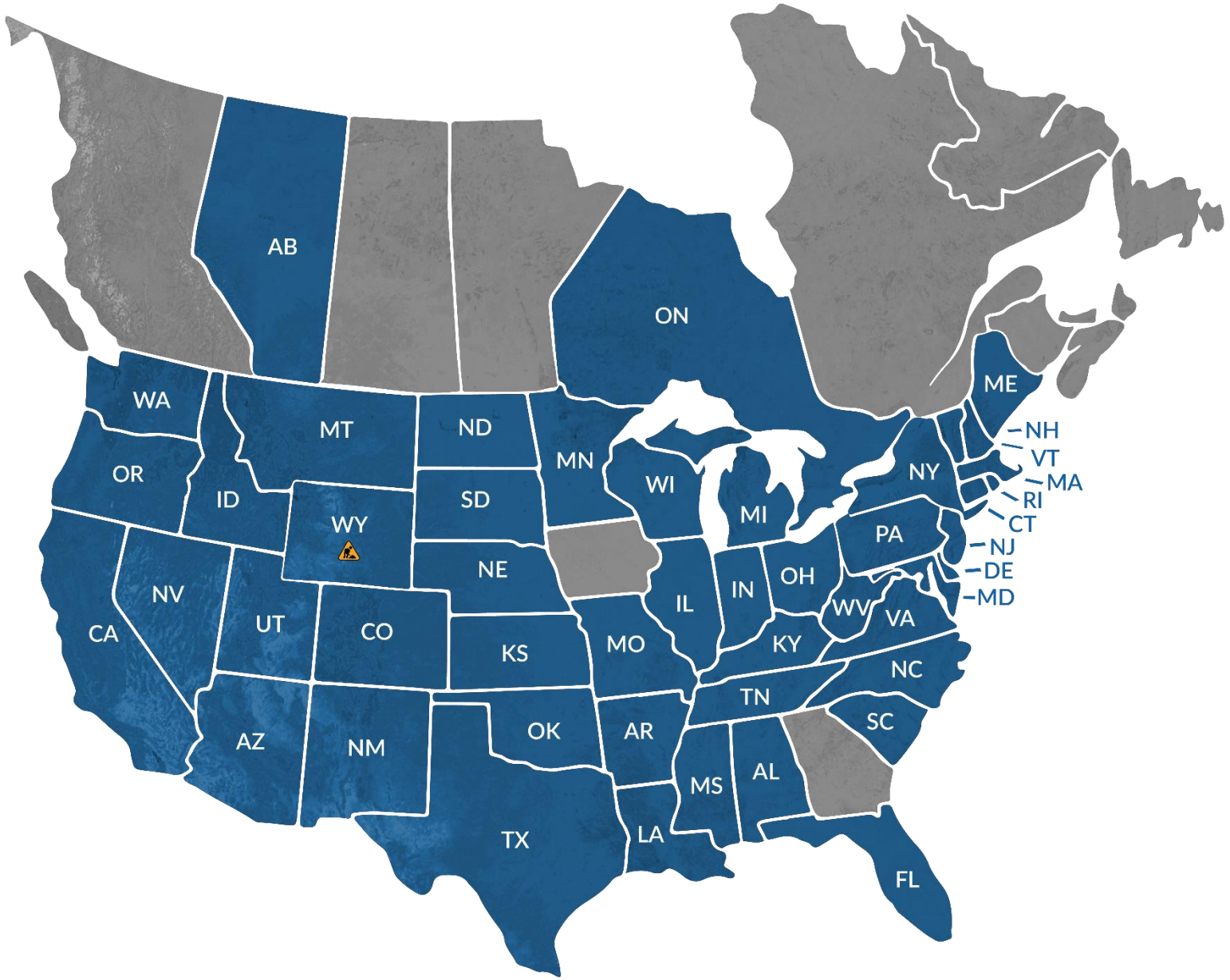

Our Reach

Roadside technology in over 800 sites across 48 states and provinces, and more to come

In-cab technology that resides in 1,800,000 (1 in 4) large trucks on the road

North America's largest Connected Truck Platform

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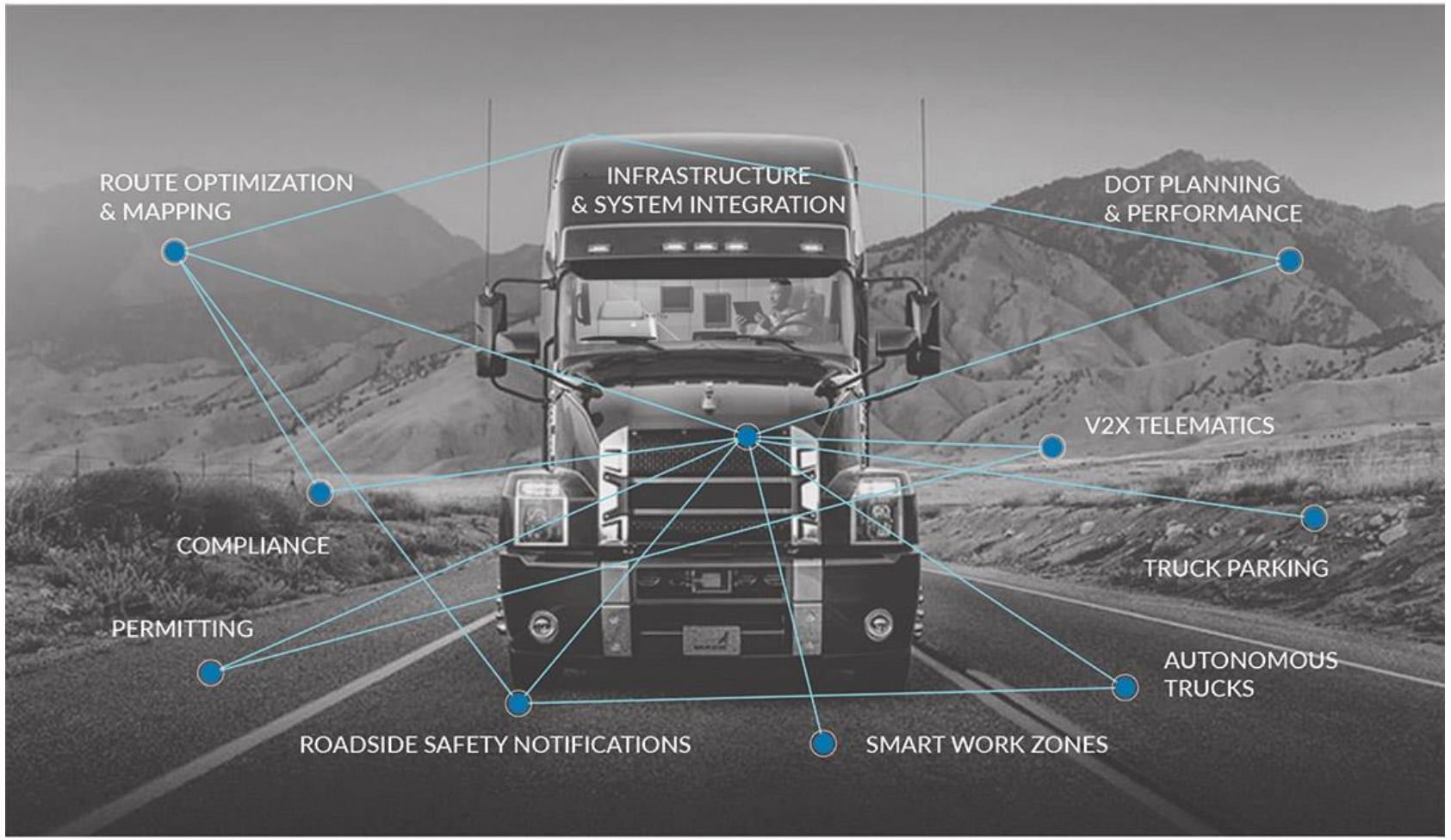
The Connected Truck



Vehicles connected to infrastructure

Onboard, offboard & roadway data fusion

Deliver services to drivers where and when they need it

Deliver data back to asset owners

Performance Based Weight Monitoring

Drivewyze integrates with Weigh-in-Motion (WIM) systems throughout the state.

Eliminates WIM application silos between enforcement and traffic planning

1. Integration of the WIM systems into Drivewyze to enable Performance Based Weight Monitoring
    - Non-traditional integration where the WIMs do not need to be installed near enforcement sites, but geo-fence linking can provide a long term and predictive tool on weigh compliance history
2. WIMs can be auto-calibrated via connected trucks to reduce maintenance costs

Port, Intermodal and Distribution Facilities

- Expedited lanes & gate automation integration
- Greenlight concept eliminates delays at checkpoints at ports, terminals, intermodal and distribution facilities
- Integration across multiple back office information systems, roadside sensors and in-cab equipment
- Enhanced transportation data (i.e. freight performance)
- Cross Agency cooperation, public/private partnership, and truck management

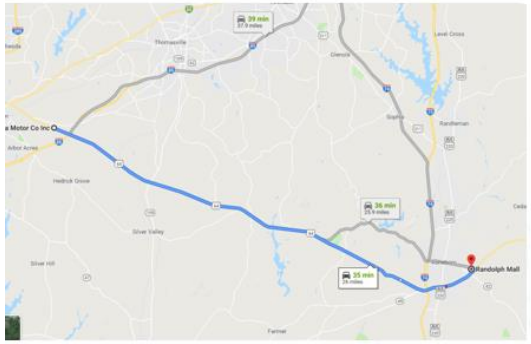
Port, Intermodal, Distribution Facility Movement Analysis

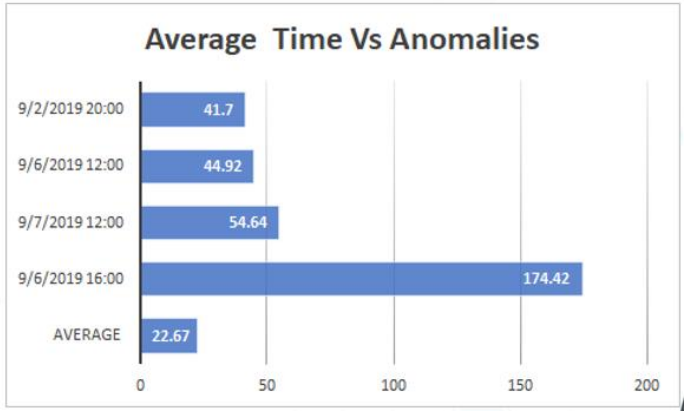
Port, Intermodal, Distribution Facility Movement Analysis

Highlights

- Vehicle travelled Eastbound on Hwy-64 without stopping, covering the entire section of road under analysis.
- Trip time: **22.8 minutes**
- Average speed: **53 miles/hour**

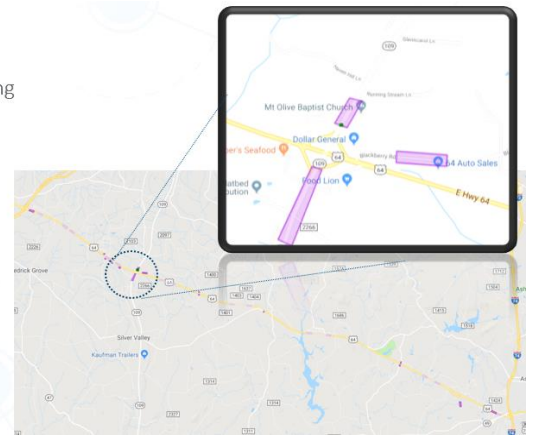
- Route :US HWY-64
  - I(I-85 to I-74)
- Average Travel Time : 22 minutes





Highlights

- Example vehicle that travelled over HWY-64 from south to North crossing the HWY at the shown point
- Trip time: **0 minutes**
- Average speed: **46 miles/hour**
- 295 vehicles crossed over HWY-64 during the analysis period



Drivewyze Safety Notifications

High rollover areas and low bridges

Built on over 20 industry and agency partnerships:

- Validates efficacy of in-cab dynamic safety messages
- Safety messaging sent directly to drivers about infrastructure restrictions, work zones, high rollover, weather, safe truck parking, road closures, steep roadways, permit updates, congestion and high crash corridors, weather, and rerouting

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Truck Parking Availability

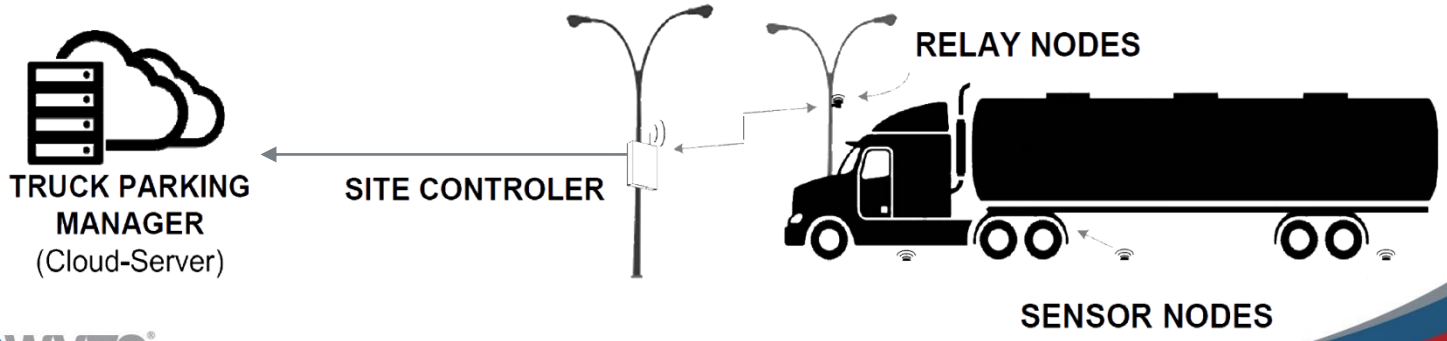
Florida DOT – Awarded contract to provide Truck Parking Availability System (TPAS) at 9 rest areas across Districts 5 & 7

Florida DOT – Successful participation in Truck Parking demonstration project with >98% parking accuracy demonstrated

Ohio DOT (MAASTO) – Awarded sub-contract to provide Statewide Truck Parking Information Management System (TPIMS) at 18 rest areas on I-70, I-71, I-75 and US-33

Hardware Neutral

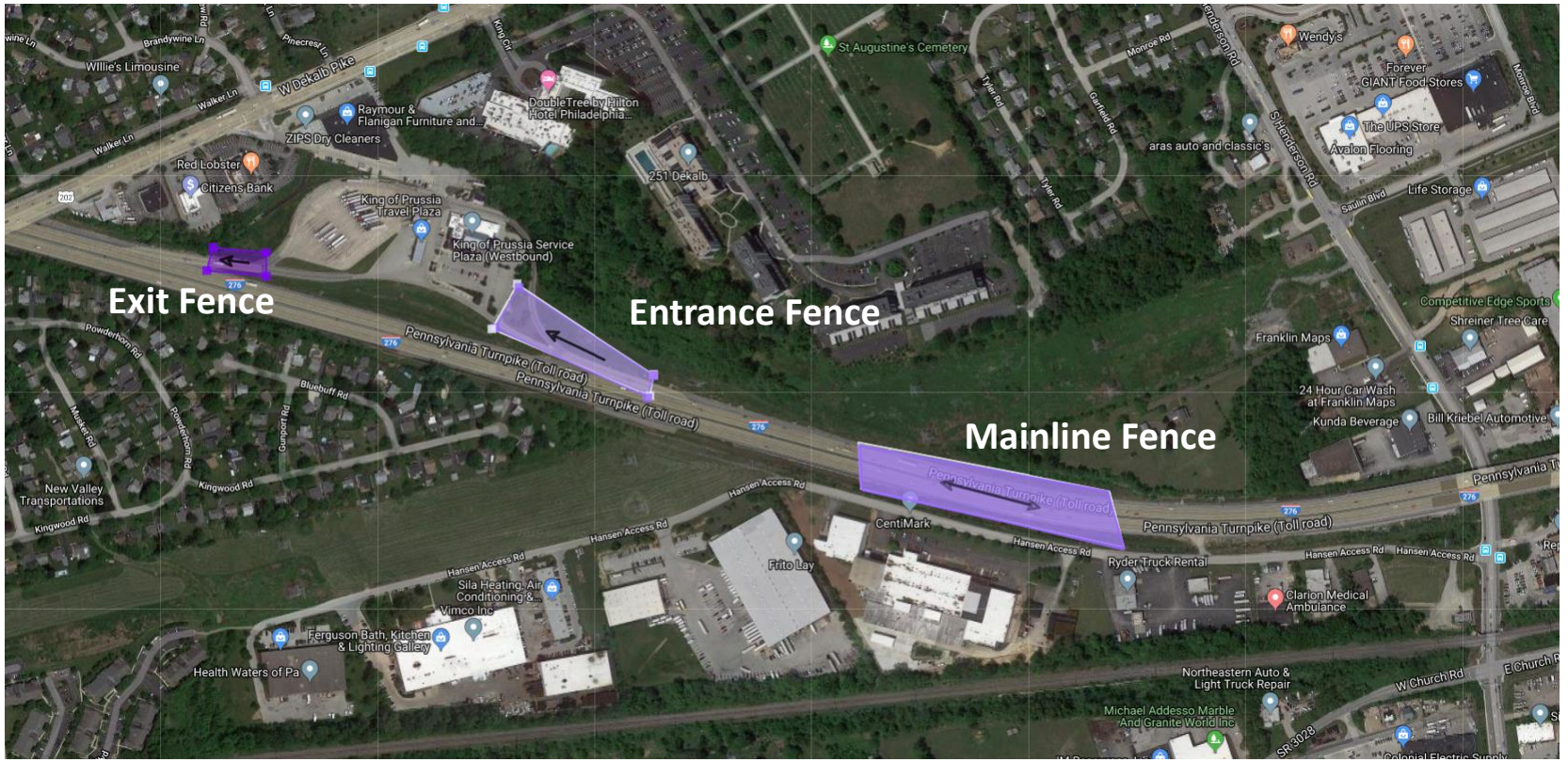
Truck parking management software integrates wireless sensors, loops, CCTV, ALPR and other camera-based sensor systems into single centralized management platform. Outputs feed information dissemination to internet, road signs and in-cab apps



Added Value

Data Collection and Analysis at Future TPMS Service Plazas

King of Prussia Geo-Fences



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Added Value

Data Collection and Analysis at Future TPMS Service Plazas

King of Prussia Data Collection (Oct 19 – Nov 1)

*Mainline Traffic = 5,471**
Service Plaza Visits = 707

Weekday Visits	Weekend Visits	Weekday Visits < 20min	Weekend Visits < 20min	Time Distribution					# of Visits by Time of Day (Every 4 Hours)					
				< 20Min	< 1hr	< 4hr	< 8hr	> 8hr	00:00-04:00	04:00-08:00	08:00-012:00	12:00-16:00	16:00-20:00	20:00-24:00
615	92	267	37	304	250	40	0	113	71	151	231	257	147	65

< 20 min Visits by Time of Day						# of Visits by Day of Week							< 20 min Visits by Day of Week						
00:00-04:00	04:00-08:00	08:00-012:00	12:00-16:00	16:00-20:00	20:00-24:00	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
26	44	75	89	44	23	141	155	134	118	67	59	33	63	69	54	49	32	24	13

* Drivewyze trucks only

Advanced Traveler Information System

- Provides penetration directly into trucks through Drivewyze platform
- Filters corridor-wide information to drivers where and when they need it. Can include emergency info, road conditions, work zones and weather

Priorities:

1. *Truck Parking Data*
2. *Roadside Safety Data*

Use of Drivewyze as a platform to disseminate agency information to travelers

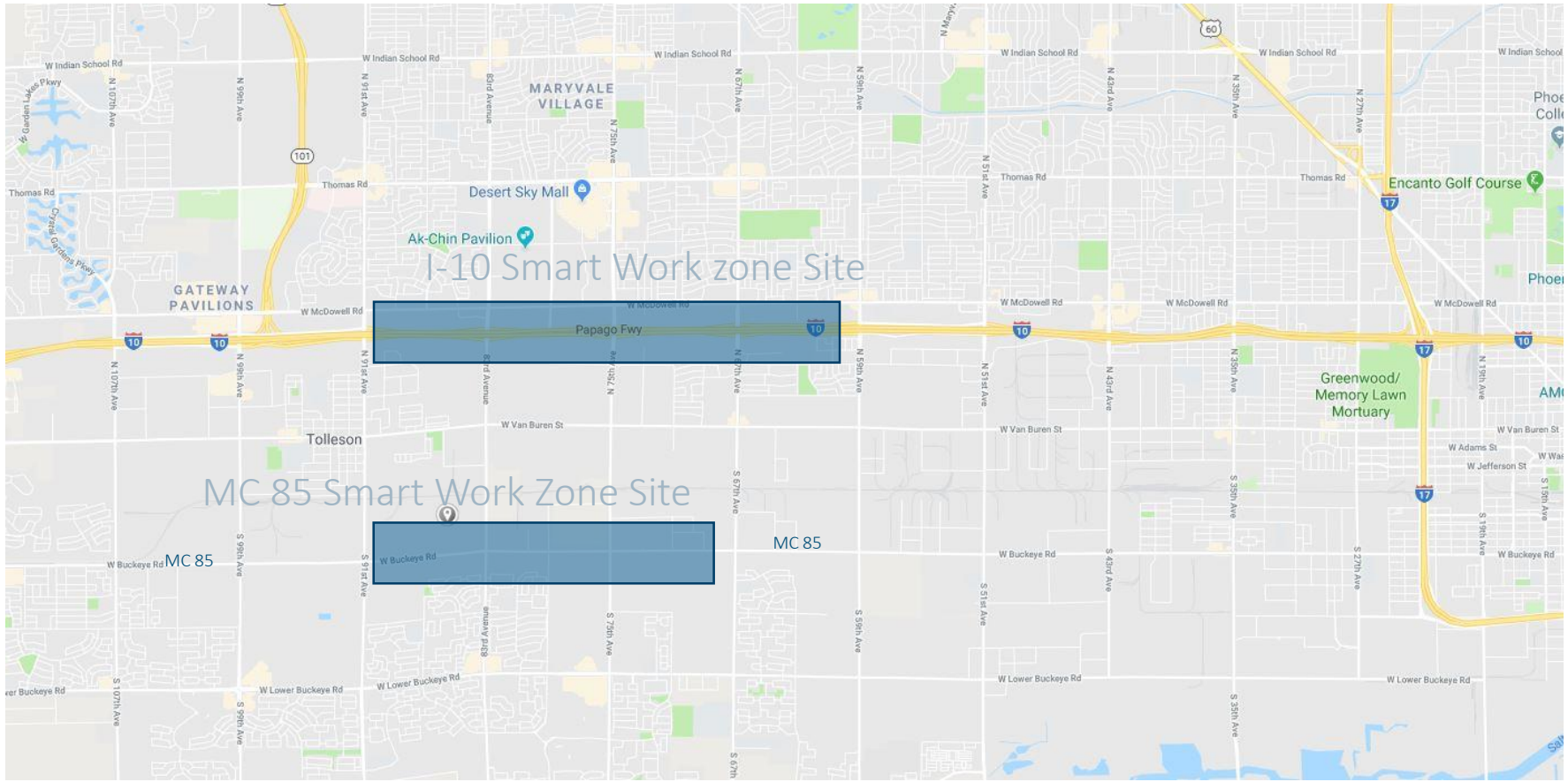
Work Zone Notifications

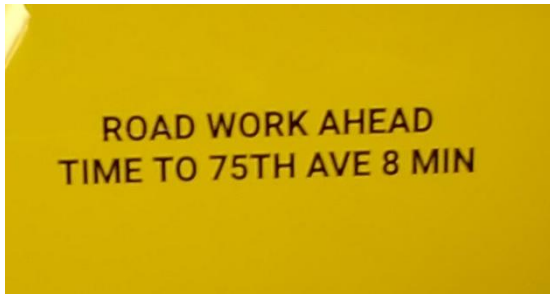
Pilot projects operational in two states

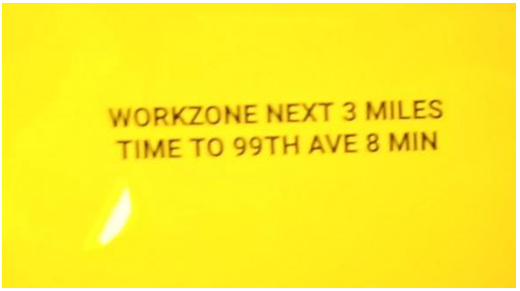
- CMVs have double the crash rate of passenger vehicles in work zones
- Notify drivers of upcoming active work zones
- Improve driver behavior by providing advanced information
- Lays foundation for other dynamic-based safety messages – weather, emergency, 511 incidents

Work Zone Notifications

Project in Arizona



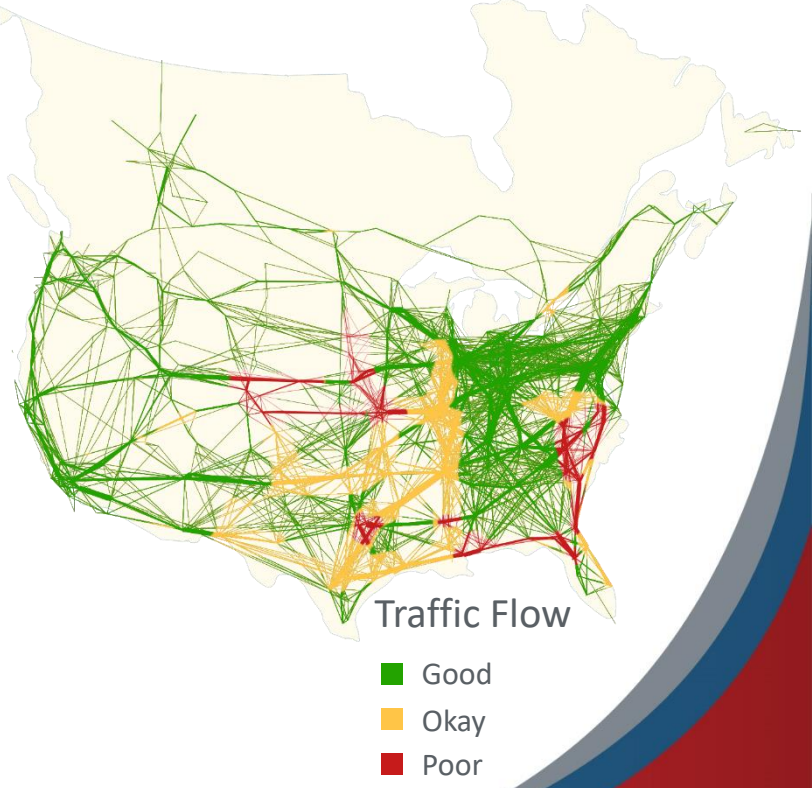




Advanced Freight Data

Unparalleled granularity to anonymized real-time freight information and insights.

- Comprehensive picture of real-time freight movement providing a more agile platform for solving key freight issues
- Improved freight transportation network and infrastructure performance to State DOTs and MPO partners for enriching planning and operational efforts
- Visualization and mapping tool for monitoring, evaluating and reporting corridor-wide performance measures and metrics of real-time movement of connected trucks
    - Includes vehicle path-of-travel, origin and destination zones, routes during on- and off-peak travel times and corridor usage
- Real-time analytics and actionable predictive informatics
- Focus is on extending development of a Connected Truck Ecosystem leveraging collaborative partnerships of industry and public sector entities



Connected Truck Team

Brian Taylor, Director of Sales
btaylor@intelligentimagingsystems.com, (306) 361-5737

Keith Wine, Director, Connected Truck
keith.wine@intelligentimagingsystems.com, (804)516-0877

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