



# Technology provider & Integrator



Intelligent Imaging Systems  
Brian Heath, CEO  
June 2015



# PIAF

Novo Paradigmo



# Performance-based Contracting

Novo Paradigmo



# RISK

Performance-based contracting



# Introduction

- Dedicated and focused on the Commercial Vehicle enforcement market
- Since 2003, innovating technology to solve commercial vehicle safety & compliance
- Market leading sensors and integration software for CVE
- Headquartered in Canada, operations throughout Canada and USA.
- 75 employees with dedicated teams in system engineering, Research & Development, software development & project management

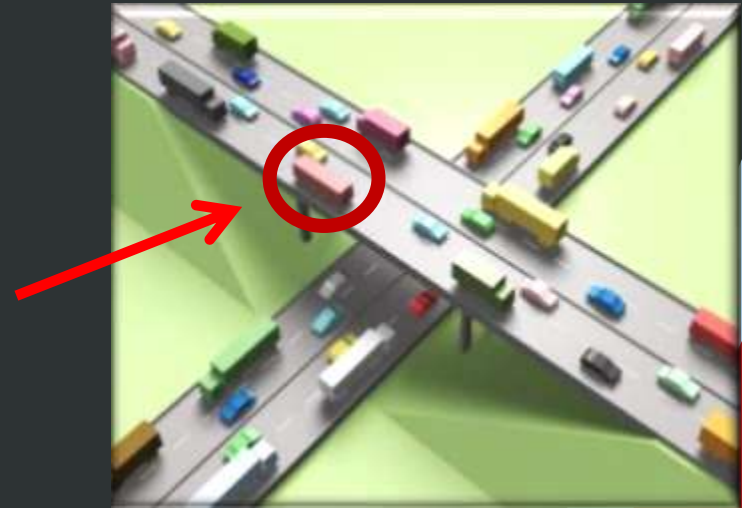


# Expertise

*The technologies supporting Smart Roadside performance start with our team.*



How do you use technology to identify this high risk truck?



Sensor and Imaging Engineers

+

Systems Integration Engineers

+

IT, Data and Software Engineers

+

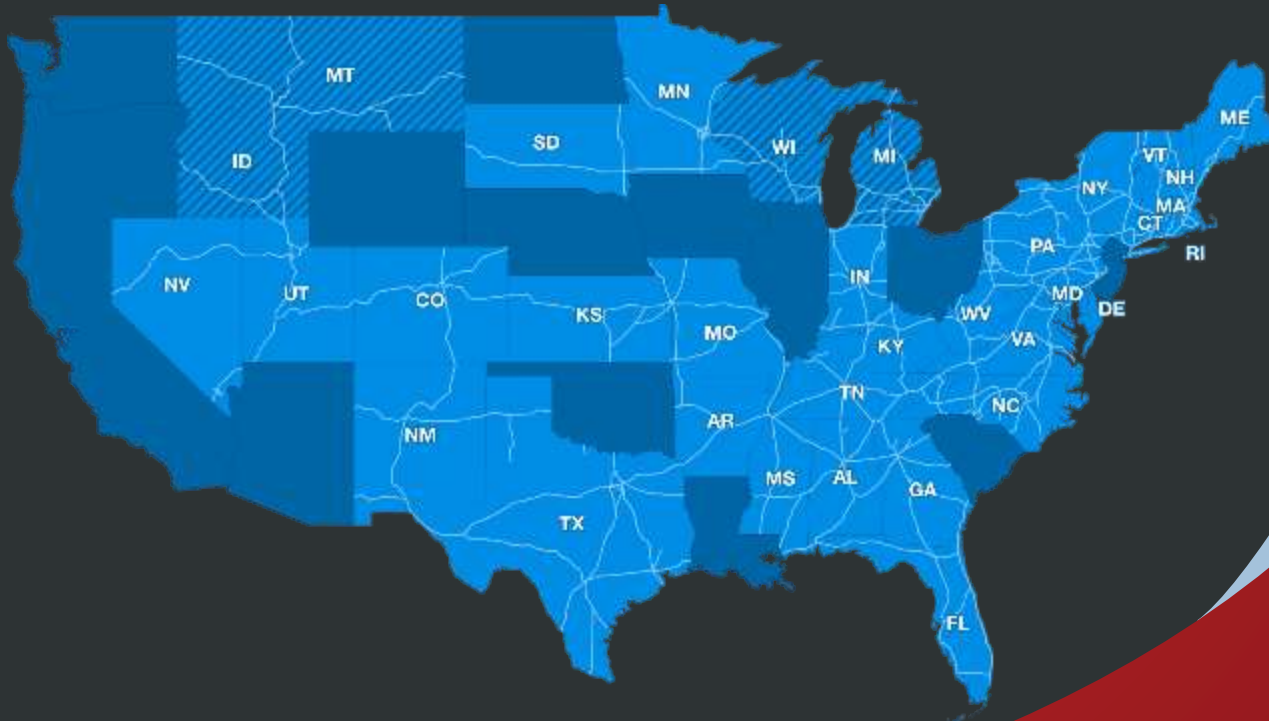
Field Installation Specialists

We bring together a world-class technical team to provide real CVO solutions.



# Deployment footprint

- 35 states (70% of US) , 5 provinces (50% of Canada)
- 585 sites



# Weigh Station Expertise







# Sensors and Inputs

- **Deployed Technologies (IIS)**
  - Overview Cameras (OVC)
  - Automated License Plate Readers (ALPR)
  - Automated USDOT Readers (AUR)
  - Automated Safety Sticker Reader
  - Automated HazMat Placard Readers
  - Vehicle Waveform Identification (VWI) sensors
  - Lane Control Signal and Direction
  - Thermal Imaging Brake Inspection
  - Weigh station control systems
  - Weigh station pre-screening systems
- **Deployed Technologies (Third Party)**
  - WIM Systems (All Vendors)
  - Static Scale Systems (Most Vendors)
  - DSRC Systems (both conventional 915MHz and 5.9 GHz systems)





## IIS Overview Cameras



Night



Day

Market leading image quality for visual truck identification  
Good images speak for themselves

# Automatic License Plate Recognition

- ***Market Leading Performance***
- Next generation camera systems include:
  - High-definition resolution
  - **Customize optics for CMV plates**
  - **Customize OCR engines for CMV plates**
  - Utilize color / infrared sensor technology
  - Mainline speed performance





## ALPR Cameras



### Commercial Vehicle Specialization

Customized optics

Customized illumination

Customized OCR

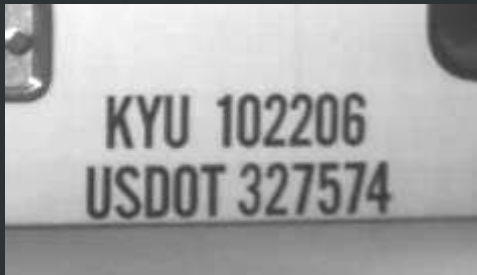
# Automatic USDOT Number Recognition (AUNR)



- Automatically identify USDOT #s of passing CMVs
- Next generation camera systems include:
  - High-definition resolution
  - Driver-safe lighting systems
  - Dynamic imaging controls for 24/7 operation
  - **Hi-speed capture up to highway speed**
  - **Market Leading Performance**



# IIS USDOT & ANTT Cameras





## ALPR Only Performance

Typical ALPR Accuracy as Stand Alone <i>Sub-System</i>	80-90%
ALPR Accuracy at Ramp Speed (5-55mph)	85-90%
ALPR Accuracy at High Speed (55-75mph)	80-85%
Systems must be designed for their environments	



## ALPR + USDOT+ Database

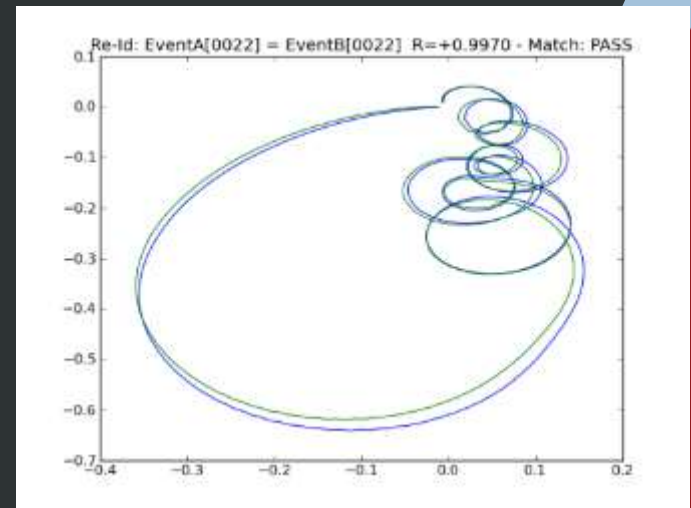
<b><i>Accuracy of Identifying a Specific Truck using database cross reference and true validation algorithm</i></b>	<b>94-98%</b>
Combined Accuracy at Ramp Speed (5-55mph)	96-98%
Combined Accuracy at High Speed (55-75mph)	94-96%





# Vehicle Waveform Identification (VWI)

- Patent-pending advanced vehicle identification, matching and tracking sensor system
- In-road sensors uniquely identify specific vehicles based on an electronic vehicle signature
- Provides the ability to track and verify vehicle movement within a weigh/inspection station



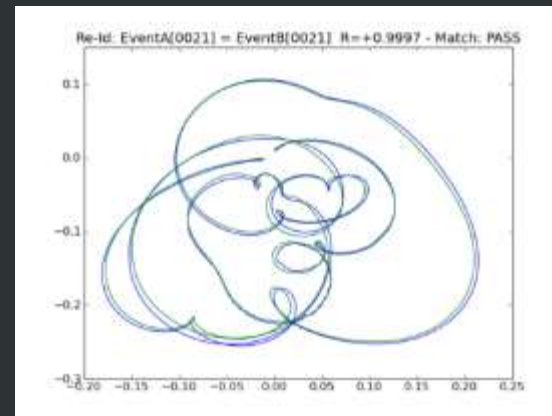
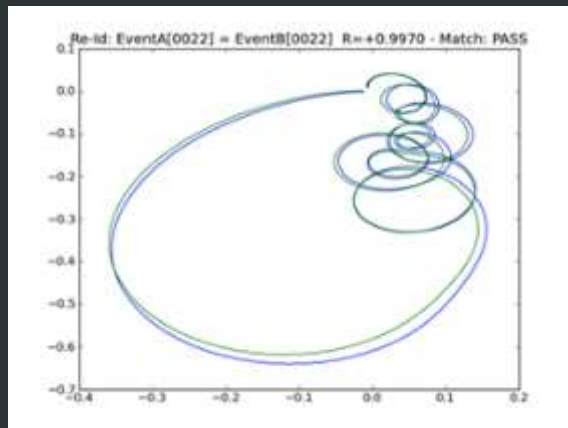
**Sensor installed between wheel paths for simple installation and long life**



# Vehicle Waveform Identification (VWI)

## High Accuracy Tracking

Absolute and unique matching of specific vehicles based on magnetic fingerprint





# Vehicle Waveform Identification (VWI)

## VWI Unique advantages

Performance matching unaffected by:

**Rain, Fog or inclement weather**

**Congestion**

**Occlusion**

**Time**



Total cost of Ownership advantages

**No re-calibrations required.**

**No lens cleaning**

**No camera repositioning**

**Not easily vandalized, tampered with**

**98% accuracy**



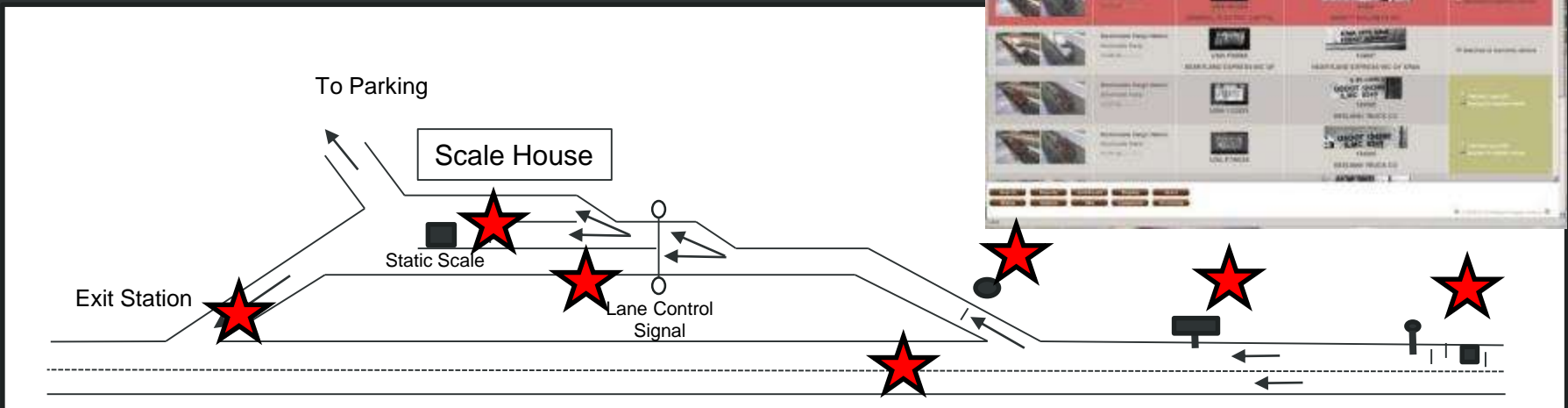
# Vehicle Waveform Identification (VWI)

Automated Sign Control/Sign Over-Rides  
Mainline or Ramp





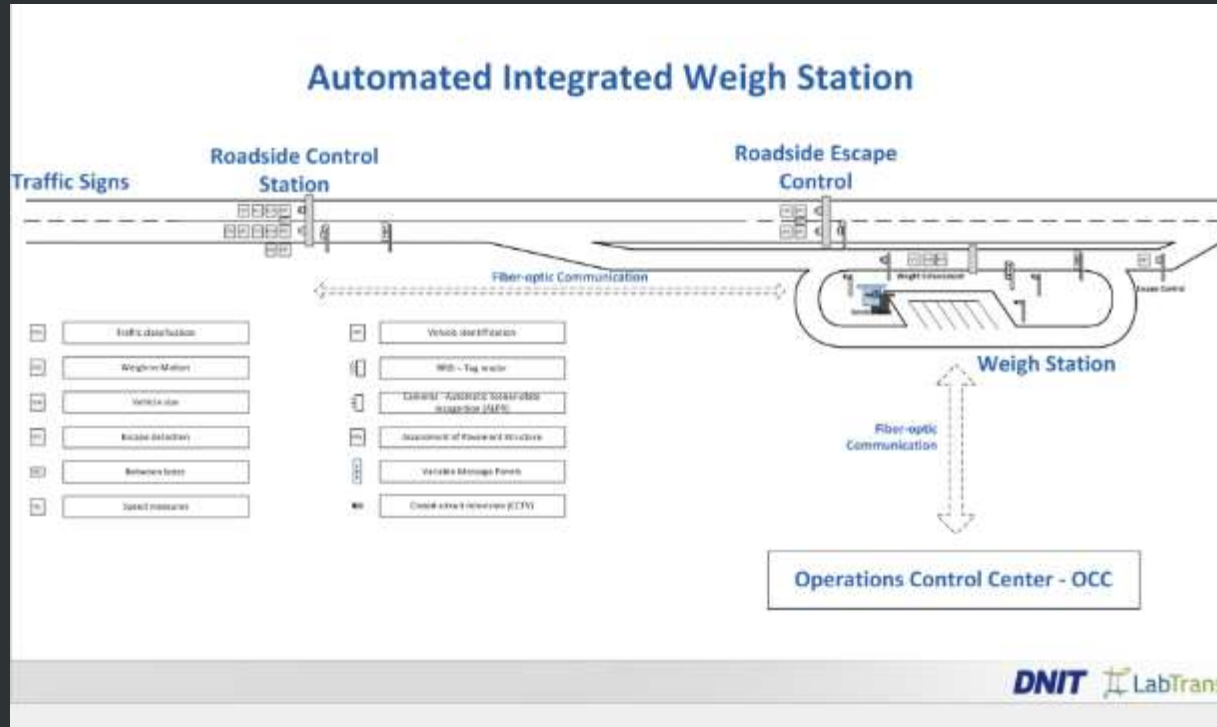
# Vehicle Waveform Identification (VWI)



## • Ideal for

- Mainline to Mainline & Mainline to Ramp matching, tracking and verification
- In-station tracking and verification
- Ability to accurately correlate and match WIM to VMS for mainline sorting.
- Ability to accurately correlate and match WIM to Static scale measurements for auto-calibration and verification

# PIAF is more than a sensor





# Smart Roadside Inspection System

- Goals and objectives
  - Screen truck traffic and identify those with the most serious issues.
  - Efficiently and productively use your limited staff to focus on high risk trucks.
  - Leverage your existing infrastructure and roadside equipment.
  - Accommodate future truck traffic increases using a technical approach, not more bricks and mortar.



# Smart Roadside Inspection System Platform

- **Modular Software Platform for Screening at Weigh/Inspection Stations;**
  - **Accepts** hardware **inputs** for all weighing, measuring, identification of truck, and identification of truck features
  - **Incorporates** interfaces to a variety of Commercial Vehicle **Data** sources
  - **Applies** a set of agency defined screening **rules** to the sensor inputs, against the data sources
  - **Generates alarms** based on these rules
  - **Directs** truck **traffic** according to the alarms generated
  - **Tracks and confirms** vehicle movement to the direction



# Smart Roadside Inspection System

## Electronic Screening Software

The screenshot displays the 'Vehicle Queue Detail' page for a white commercial truck. The interface includes a navigation bar with 'Previous', 'Current', 'Next', and 'Top' buttons. The main content area shows the truck's location as 'Interstate X, Southbound' and a timestamp of '2009-02-20 07:26:43'. A red alert banner indicates '7 Alerts'. The 'Vehicle Overview' section features two images of the truck. To the right, the 'Plate Number' is '1032768 IN' and the 'USDOT Number' is '054283'. Below these, sensor status is shown: 'WIM sensor' (green), 'AVI sensor' (green), 'Radiation sensor' (green), and 'Other sensor' (grey). The 'Weight in Motion' section displays five axle weights: 11,740 lbs (red), 16,500 lbs (green), 16,520 lbs (green), 17,476 lbs (red), and 18,505 lbs (green). A 'Report' button is next to the weights. The 'This Vehicle's Alerts' section lists seven alerts: 'Plate / DOT Mismatch Alert', 'NCIC Alert', 'Tax Alert' (Unpaid fee: \$500), 'Tax Alert' (Unpaid fee: \$250), 'Plate / DOT Mismatch Alert', 'NCIC Alert', and 'Tax Alert' (Unpaid fee: \$500). A 'Show Raw Data' button is at the bottom left.

- The most advanced & flexible electronic screening platform for commercial trucks

- Deployed at over 500 weigh stations

- On premise and cloud-based solutions

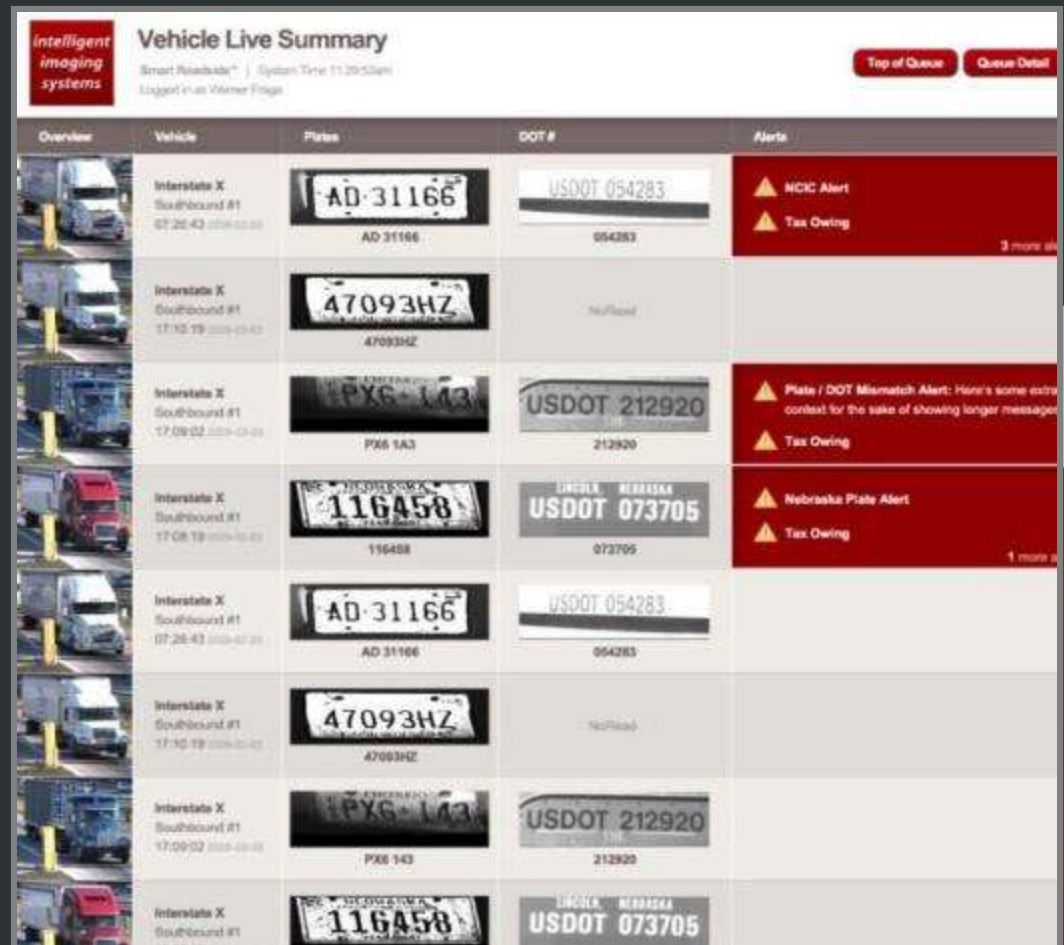
- Hardware neutral, over 40 off-the-shelf sensor integrations

- Customizable language, interface


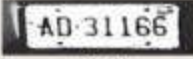


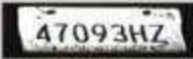







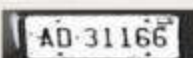


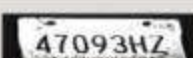


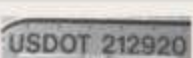



# Smart Roadside Inspection System

## Electronic Screening Software

- Provides automated alerts to roadside inspectors
- Includes user-definable screening / filtering rules
- Allows both live/historical monitoring
- Provides modular site by site configuration to accommodate existing infrastructure



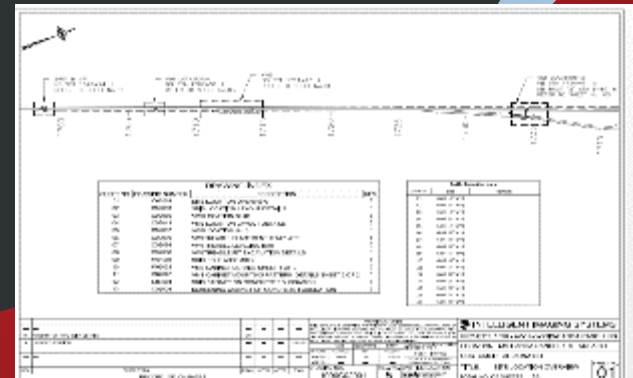
The screenshot displays the 'Vehicle Live Summary' interface. At the top left is the 'intelligent imaging systems' logo. The title 'Vehicle Live Summary' is followed by 'Smart Roadside™ | System Time 11:29:52am' and 'Logged in as: Mike Frigo'. On the top right are 'Top of Queue' and 'Queue Detail' buttons. The main content is a table with columns: Overview, Vehicle, Plates, DOT #, and Alerts. The table lists several vehicles with their respective license plates and DOT numbers. Alerts are shown in red boxes on the right side of the table, including 'NCIC Alert', 'Tax Owing', 'Plate / DOT Mismatch Alert: Here's some extra context for the sake of showing longer messages', 'Nebraska Plate Alert', and 'Tax Owing'.

Overview	Vehicle	Plates	DOT #	Alerts
	Interstate X Southbound #1 07:26:43 2024-03-28	 AD 31166	 054283	<ul style="list-style-type: none"><li>▲ NCIC Alert</li><li>▲ Tax Owing</li></ul> <a href="#">3 more alerts</a>
	Interstate X Southbound #1 17:10:19 2024-03-28	 47093HZ	No Read	
	Interstate X Southbound #1 17:09:02 2024-03-28	 PX6 143	 212920	<ul style="list-style-type: none"><li>▲ Plate / DOT Mismatch Alert: Here's some extra context for the sake of showing longer messages</li><li>▲ Tax Owing</li></ul>
	Interstate X Southbound #1 17:08:19 2024-03-28	 116458	 073705	<ul style="list-style-type: none"><li>▲ Nebraska Plate Alert</li><li>▲ Tax Owing</li></ul> <a href="#">1 more alert</a>
	Interstate X Southbound #1 07:26:43 2024-03-28	 AD 31166	 054283	
	Interstate X Southbound #1 17:10:19 2024-03-28	 47093HZ	No Read	
	Interstate X Southbound #1 17:09:02 2024-03-28	 PX6 143	 212920	
	Interstate X Southbound #1	 116458	 073705	

# Smart Roadside Inspection System

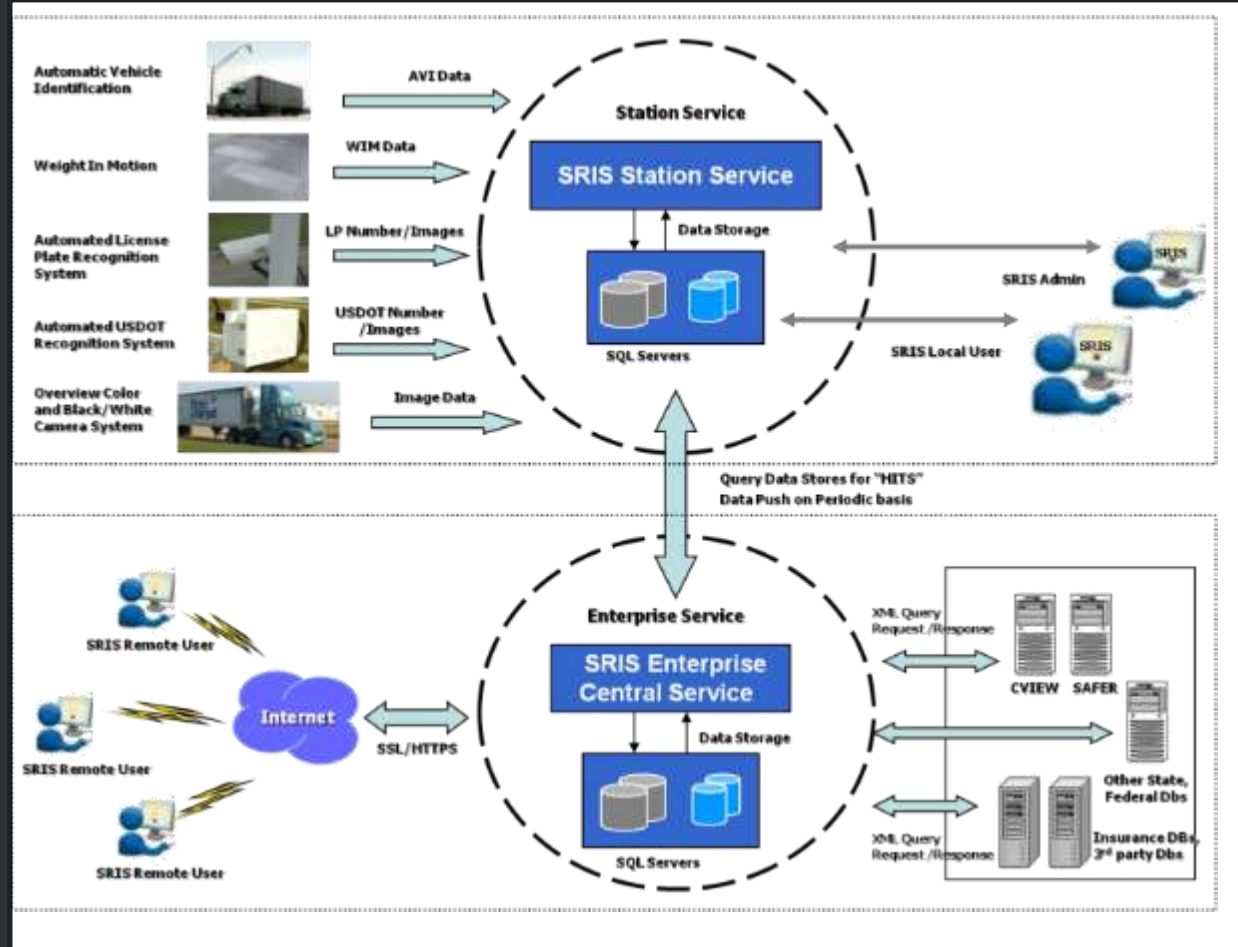


## Canoa Ranch, Arizona



# Enterprise Software

- Ties roadside data to back-end information networks
- Integrates to operations software
- Automatically identifies unsafe vehicles for advanced roadside screening
- Designed with flexible / extensible architecture
- Allows both local/ remote access
- Provides a cohesive, centrally managed enforcement program



# Smart Roadside Inspection System

## REPORTING



# SRIS Dashboards

- Alerts – by carrier

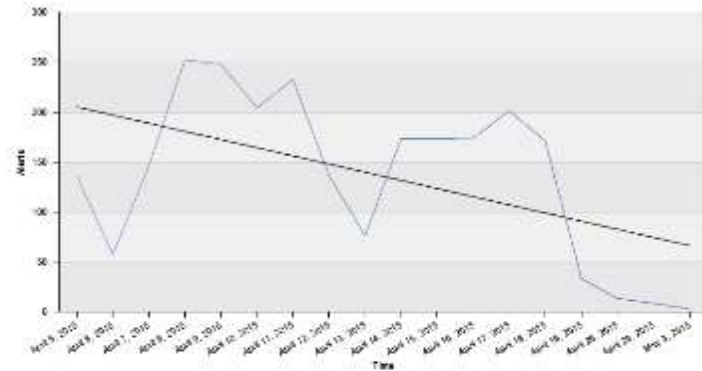
## Alert Details - CRST EXPEDITED INC April 5, 2015 - May 5, 2015

[Click this \(dashboard\) to determine where and when alerts are occurring for the selected carrier. \(more\)](#)

**990.2** Alerts Per 1000 Site Visits

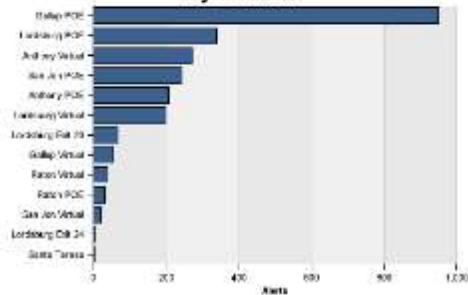
2,461 Site Visits

2,437 Alerts (over 11qt)

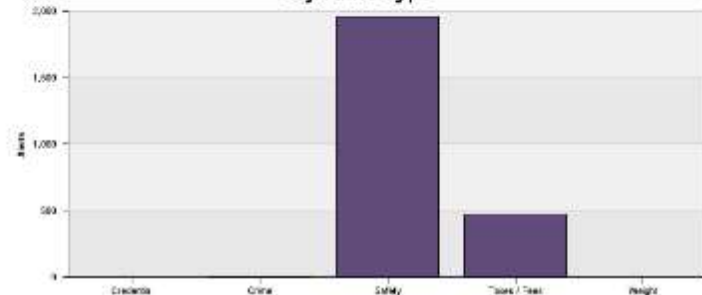


Select a Station to drill down:

### By Station



### By Alert Type





# SRIS Dashboards

- Alerts – by station

## Alert Details - Anthony Virtual

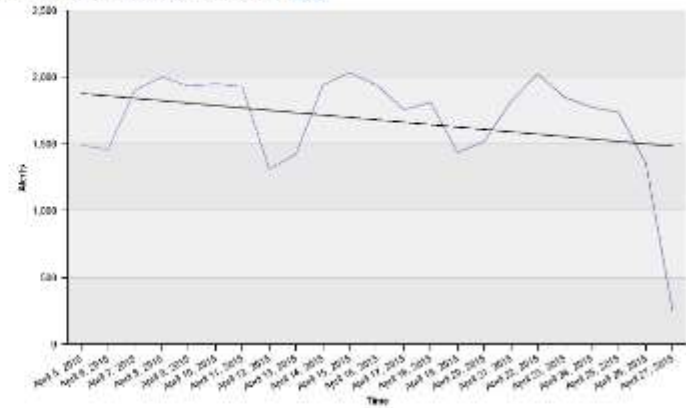
April 5, 2015 - May 5, 2015

Use this Dashboard to determine who is causing large numbers of Alerts and when, for the selected station. [\[more\]](#)

# 419.4 Alerts Per 1000 Site Visits

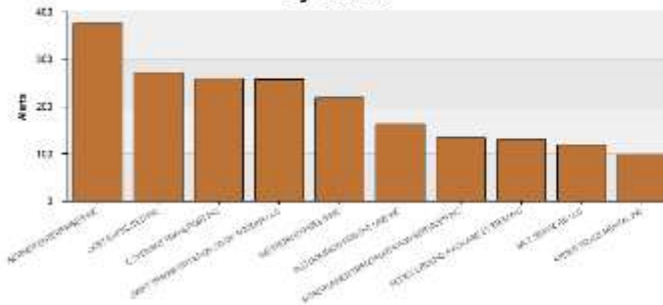
92,139 Site Visits

38,644 Alerts (level: High)



Select a Carrier to drill down:

### By Carrier



### Peak Alert Times [\[details\]](#)

Alerts	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
12 Midnight	534	425	446	550	514	471	560
4:00:00 AM	721	715	750	915	822	738	887
8:00:00 AM	1,217	1,033	1,224	1,288	1,323	1,245	1,177
12:00:00 PM	1,343	1,078	1,447	1,511	1,445	1,359	1,202
4:00:00 PM	1,133	885	1,002	1,157	1,144	999	1,094
1:00:00 PM	590	554	732	650	571	634	779



# SRIS Dashboards

- Alerts

## Alerts - All Stations

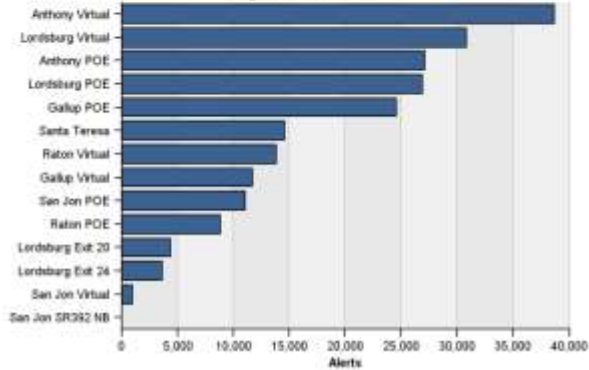
April 5, 2015 - May 5, 2015

Use this Dashboard to determine who is causing large numbers of Alerts and Where. [more](#)

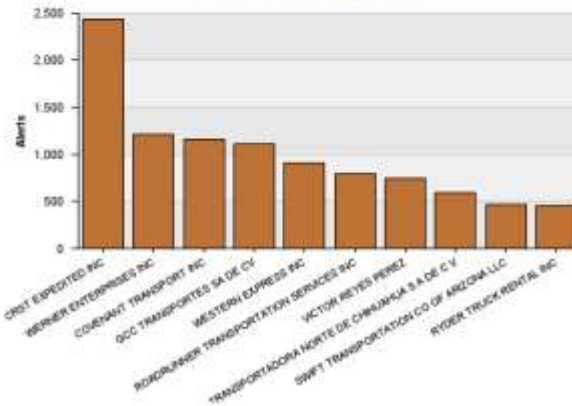


Select a Station or Carrier to drill down:

### By Station



### By Carrier [\(details\)](#)



### Peak Alert Times [\(details\)](#)

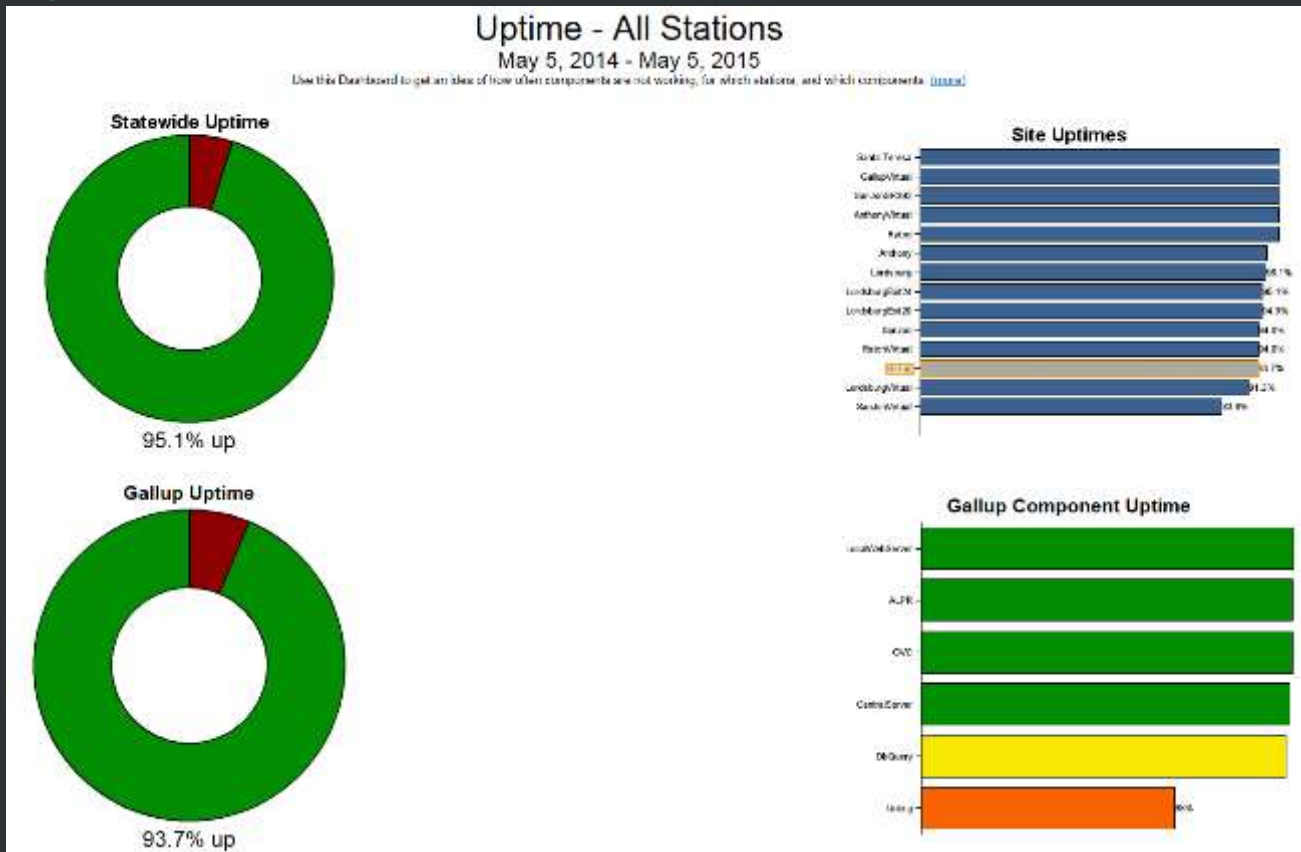
Alerts	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
12 Midnight	2,878	2,002	2,155	3,012	2,591	2,579	2,339
4:00:00 AM	4,494	3,748	4,358	4,999	4,561	4,485	3,803
8:00:00 AM	7,558	5,999	7,690	8,300	6,938	7,388	7,001
12 Noon	7,323	8,281	8,342	8,475	7,368	7,339	6,515
4:00:00 PM	5,581	5,243	6,817	6,624	5,836	5,705	5,712
8:00:00 PM	3,181	3,151	4,348	3,633	3,415	3,500	3,635





# SRIS Dashboards

- Uptime





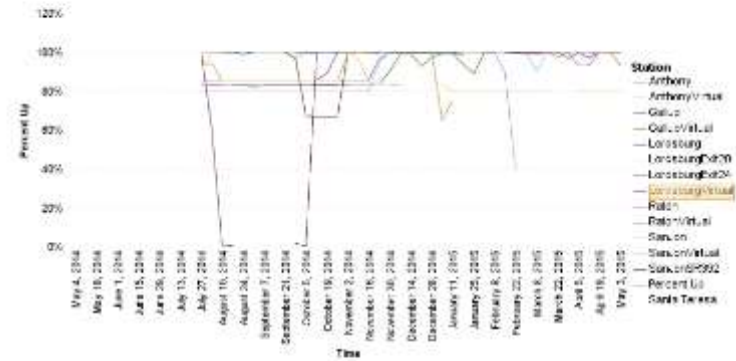
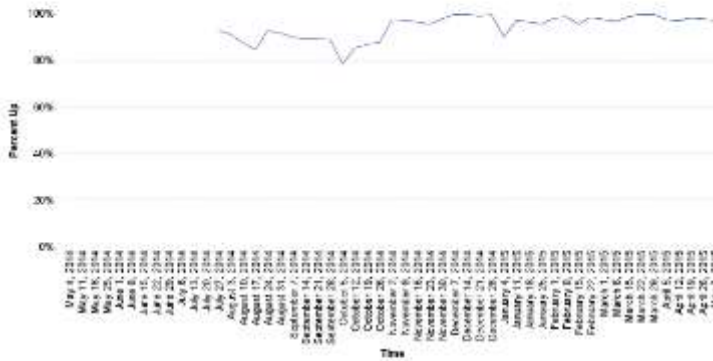
# SRIS Dashboards

- Uptime - Trend

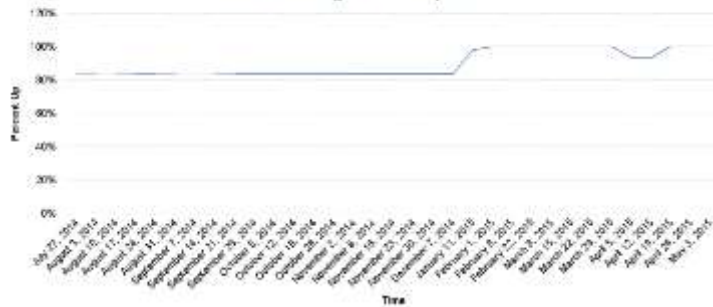
## Uptime vs Time - All Stations

May 5, 2014 - May 5, 2015

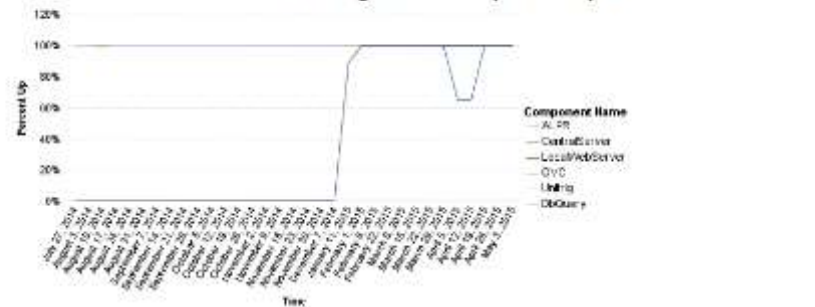
Use this Dashboard to get an idea of when components are not working, for which stations, and which components. [more](#)



## LordsburgVirtual Uptime



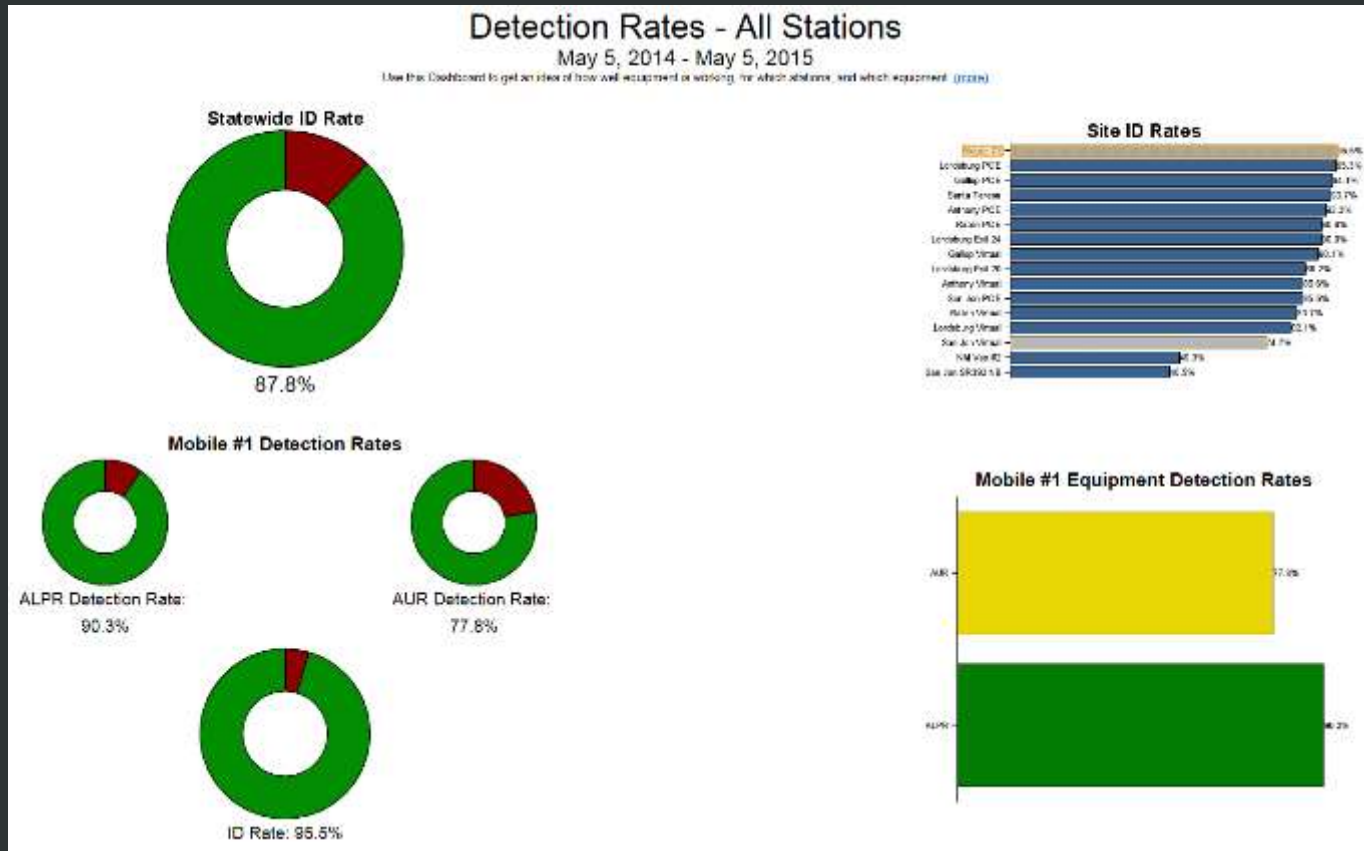
## LordsburgVirtual Component Uptime





# SRIS Dashboards

- Detection Rates





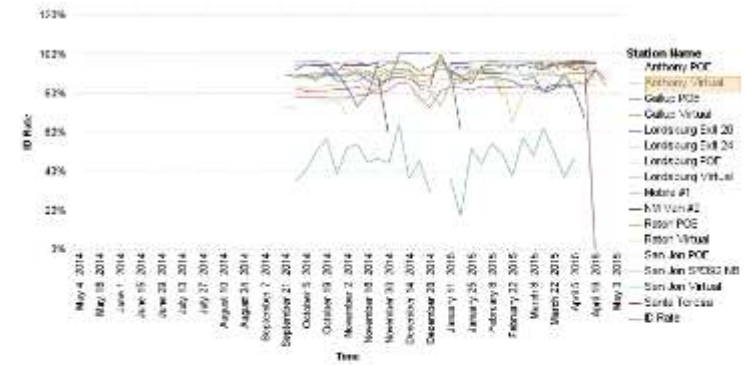
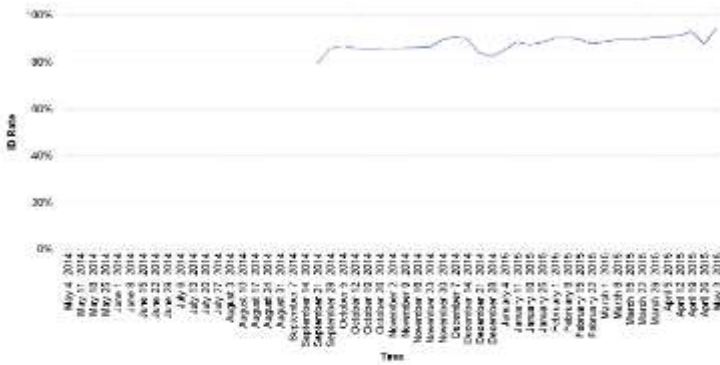
# SRIS Dashboards

- Detection Rates - Trend

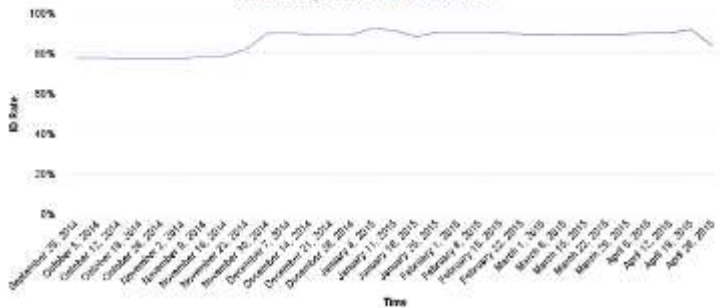
## Detection Rates vs Time - All Stations

May 5, 2014 - May 5, 2015

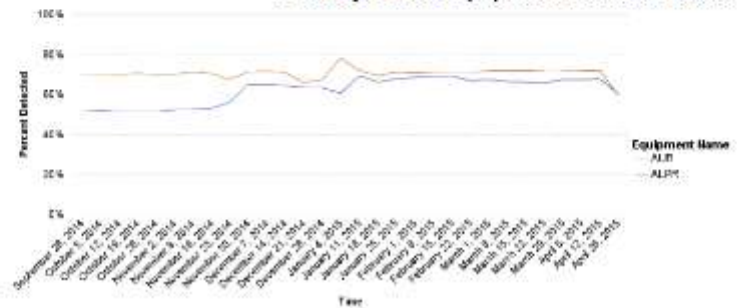
Use this Dashboard to get an idea of when equipment is not working optimally, for which stations, and which equipment [\(more\)](#)



### Anthony Virtual ID Rates



### Anthony Virtual Equipment Detection Rates





# SRIS Dashboards

- Business

## Business Dashboard

May 5, 2014 - May 5, 2015

### Agency Benefits:



(time savings not available - awaiting IMCS integration)



- \$1,105,589 Tax - Temporary Permit Issue - Vehicle
- \$228,629 Tax - Temporary Permit Issue - Carrier
- \$106,094 Tax - Non Filer
- \$579 Tax - Delinquent Filer

### Industry Benefits:



4,331 Hours



20,790 Gallons Fuel



551 Tonnes CO2



\$451,150 Operational Costs

#### Sources:

Average of 5 Minutes / Inspection  
 Average of 0.4 Gallons Fuel / Per Inspection  
 Average of 0.000388 Tonnes CO2 per Inspection  
 Average of \$1481 Operation Costs per Inspection  
 Average of 2 % of Vehicles Inspected

U.S. Department of Transportation "Economic Analysis and Business Case for Motor Carrier Industry Support of CMVET" October 2, 2007

U.S. Department of Transportation "Economic Analysis and Business Case for Motor Carrier Industry Support of CMVET" October 2, 2007



# Commercial-off-the-Shelf

- VWI & Smart Roadside
- Fully developed
- Deployed and working solutions
- Commercial –off-the-shelf





Reduce  
RISK



## CONTACT INFORMATION



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