

# Technologies for Commercial Vehicle Safety, Security, and Efficiency: Kentucky's Experience

2007 Kentucky Freight Conference



# Overview of Presentation

- Current Technologies/Projects
  - CVISN
  - Electronic Screening / NORPASS
  - Electronic Credentialing
  - The Kentucky Clearinghouse
  - Virtual Weigh Station
  - Onboard Commercial Vehicle Safety System
  - ISSES
- Technologies/Projects on the Horizon
  - CVIEW
  - Expanded CVISN
  - Mobile ISSES
  - Next-Generation Virtual Weigh Station

# What is CVISN?

- “Commercial Vehicle Information Systems and Networks”
- A National Program managed by the Federal Motor Carrier Safety Administration (FMCSA)
- Purpose is to promote and guide the deployment of technologies, information systems, and communications networks to improve the safety and efficiency of commercial vehicle operations.

# CVISN Technologies

- Electronic Screening
  - Screening trucks more efficiently at weight/inspection stations using electronic technology
- Safety Data Exchange
  - Electronic uploads of inspection data
  - Making safety data available to enforcement personnel at the roadside
- Electronic Credentialing
  - Allowing carriers to register, file tax returns, etc. online

# Kentucky's Role in CVISN

- In 1996, Kentucky was selected as a "Model Deployment State" for CVISN
- Kentucky was first state in U.S. to deploy all the required technologies and achieve "level one" compliance.
- Kentucky has been a national leader throughout the course of the CVISN program.

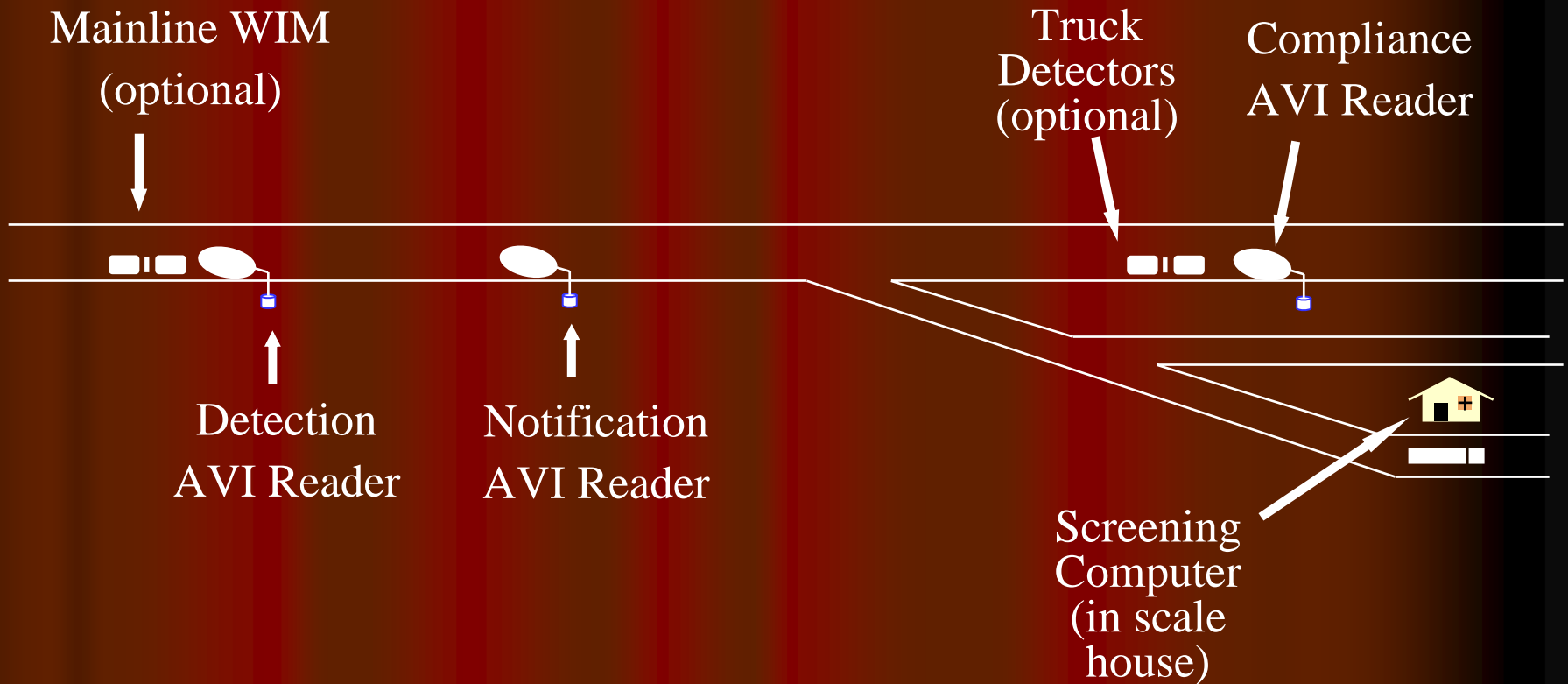
# Specific CVISN Technologies Deployed in Kentucky

- Electronic Screening
- Electronic Credentialing
- Electronic entry and upload of inspections
- Making safety and credentials data available at the roadside
- Virtual weigh stations

# Electronic Screening



# Typical E-Screening Site Layout



(Not to Scale)



# Electronic Screening Software

**Mainline Automatic Clearance**

File Edit View Help

Location:   Station Sign:

Alarm:

Device Status:  Advance  Comply  Sign  Notify  Wim  TD

6/15/2000 9:41:44 AM

**Current Vehicle List**

Time	Carrier Name	Tag Id	License	Unit No.	Weight	Decision	Reason
09:40:52 AM	Averitt Express, Inc.	30803903	TN 3532HZ	9450	0	Pullin	Random Selection (Scored 21 out of 10)
09:40:24 AM	Ard Trucking Company, Inc.	B080083D	SC P720022	98	0	Bypass	No Violations (Scored 60 out of 10)

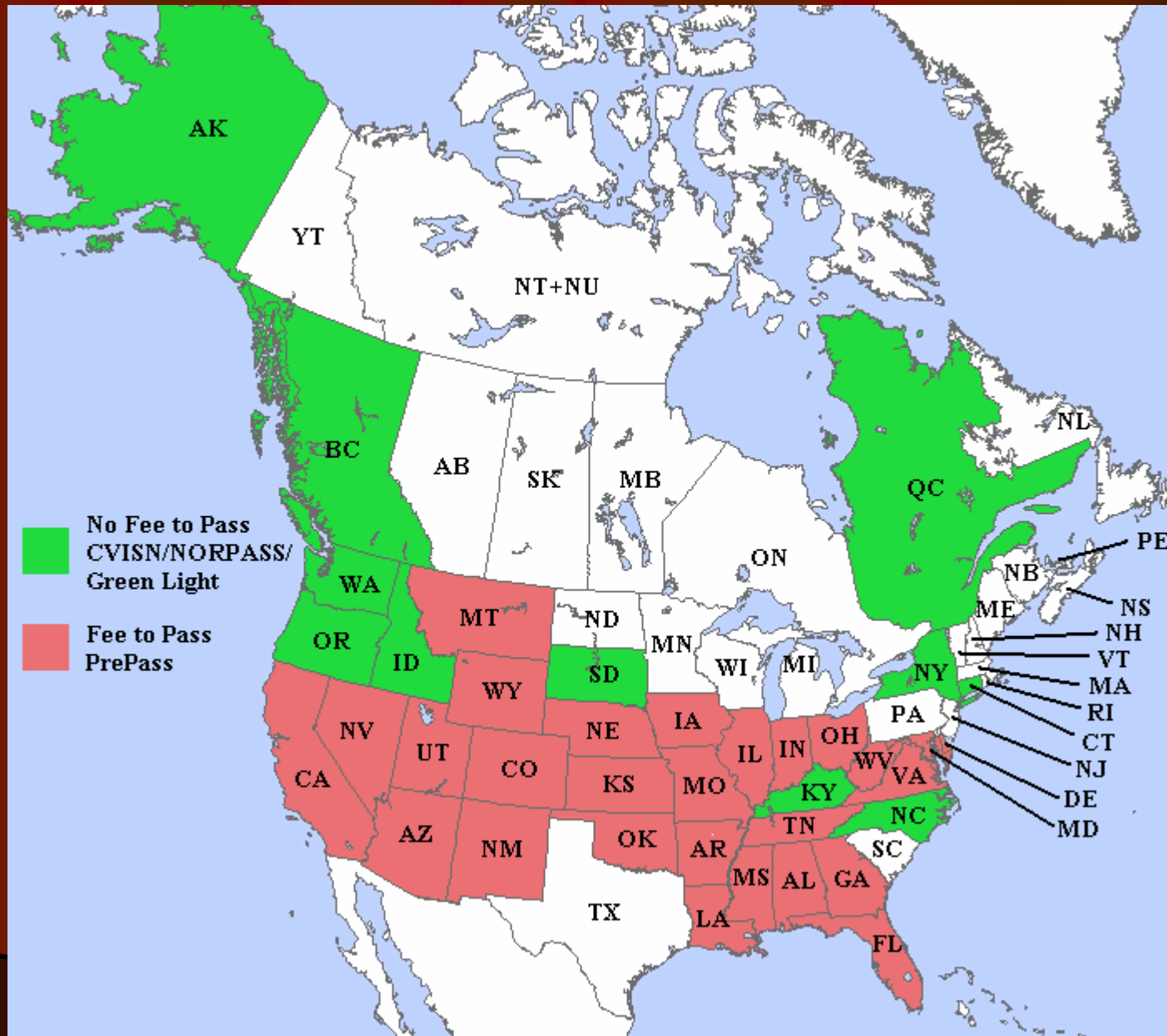
**Pullin List**

Time	Carrier	Reason
09:41:38 AM	Batesville Casket Company	Random Selection (S

**Bypass List**

Time	Carrier	Reason
09:41:24 AM	American Freightways, Inc.	Gold Status

# The North American Picture



# Electronic Credentialing

## KY Transportation Cabinet Division of Motor Carriers

### Electronic Tax Filing and Vehicle Inventory

Sign up and demonstrations

#### Section 1: Information

If you would like to *file electronically* you will need to complete an **AUTHORIZATION AGREEMENT FOR PREAUTHORIZED PAYMENTS** (ACH Debit) form or **VOUCHER AGREEMENT** form. This authorization will also grant access to *view your vehicle inventory on-line*. You **DO NOT** need to sign up for ETF to add/delete vehicles on-line.

[General Information and](#)

[Frequently Asked Questions on Electronic Tax Filing](#)

***Canadian transactions not available at this time.***

#### Section 2: Sign up forms

The **AUTHORIZATION AGREEMENT FOR PREAUTHORIZED PAYMENTS** form and **VOUCHER AGREEMENT** form is available for the following taxes listed below.

Please complete on-screen and click the validate button at the bottom of the page before printing.

A. KYU ACH Debit only	<a href="#">ACH Debit</a>	
B. KIT	<a href="#">ACH Debit</a>	<a href="#">Voucher</a>
C. IFTA	<a href="#">ACH Debit</a>	<a href="#">Voucher</a>

Please read all instructions and include a voided check (ACH debit only) when mailing to this office.

#### Section 3: Demonstration

**DEMONSTRATION** for Electronic Tax Filing (ETF).

The password for these demonstrations is "password".

**This is for DEMONSTRATION purposes only!!!**

**Not to be used for actual filing of tax returns on-line.**

# Electronic Credentialing Example

Kentucky.gov

## Kentucky Transportation Cabinet Division of Motor Carriers Electronic Filing of Kentucky Tax Return (IFTA)

[Return to Motor Carriers Home](#)   [IFTA Instructions](#)

Demo Demo Demo Demo Demo Demo Demo Demo Demo Demo Demo Demo

LOGIN

SUMMARY

DIESEL

GASOLINE

IFTA Number: KY-

Password:

Person Completing:

Phone #:

Format: 9999999999 or (999) 999-9999

Begin Filing

Re-Print IFTA form

[Return to Motor Carriers Home](#)   [IFTA Instructions](#)

If you experience trouble completing the application, please contact the Division of Motor Carriers @ 502-564-4540 Monday-Friday between 8:00 and 4:30 EST.

Generated date: Sunday, April 15, 2007 10:34:58 PM

# Electronic Credentialing Capabilities

- Quarterly tax filings (IFTA, KYU, KIT)
- IRP Renewals, updates, transfers
- Order overweight or over-dimensional permit
- Allows payment by ACH debit or by printing voucher and sending check
- All back-room accounting work is done automatically by system.

# Safety Data Exchange



**SAFER**  
Safety and Fitness  
Electronic Records System

# Electronic Upload of Inspection Data

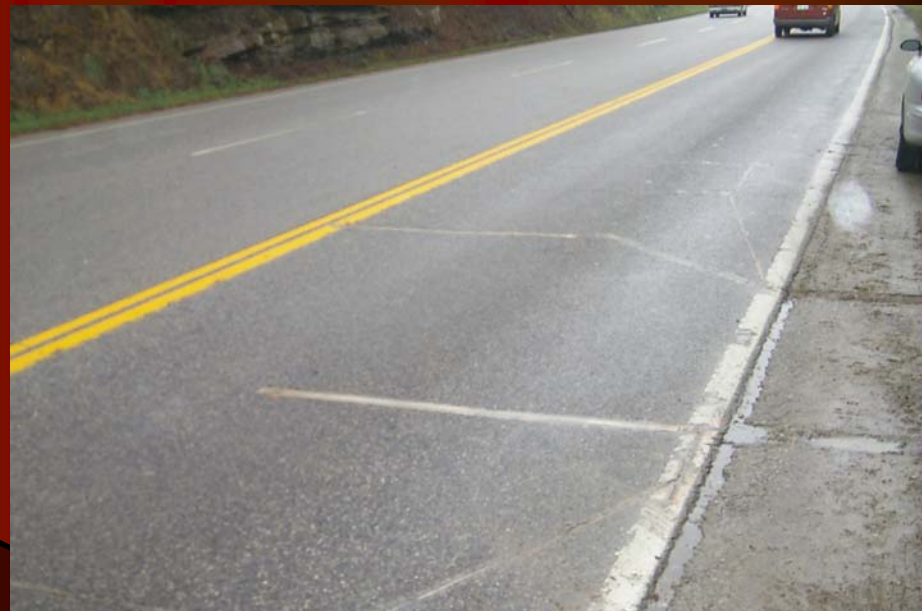
- All KVE inspectors and officers have access to computers (laptops on cruisers, desktops in weigh stations).
- Inspections and citations are entered into computer and uploaded electronically to national databases.
- This saves time and improves accuracy.

# The Kentucky Clearinghouse

- Provides a “snapshot” on every motor carrier that operates in Kentucky
- Provides a quick check on the following:
  - USDOT status
  - Extended Wt. Decal?
  - KIT status
  - Transponder?
  - IFTA status
  - PRISM status?
  - SSRS status
  - KYU exempt?
  - IRP status
- Used for electronic screening, “manual” screening, and issuance of credentials



# The Virtual Weigh Station




# What is a VWS?

- Definitions vary widely
- In general, a VWS provides some (or all) of the functionality of a normal, fixed weigh station, at a location where a normal weigh station is not practical.

# VWS Software

Virtual Weigh Station



**Data**

**General Data**

Date	06/19/20	Class	9
Time	10:56:48	Weight	80000
Sequence	1794	Length	62.400001
Nbr Axles	5	Speed	

**Axle Separation**

1-2	151	5-6	0
2-3	42	6-7	0
3-4	273	7-8	0
4-5	42	8-9	0

**Axle Weights**

1	102	5	179
2	162	6	0
3	170	7	0
4	188	8	0

**Data Input**

US DOT

ICC NC

KYU

Plate

State

Other Data

Save Cancel

Image Review Options

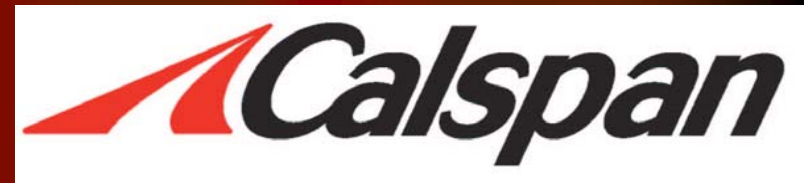
Current Image  Camera 1 Camera 2

Zoom

Zoom Factor

Pause Enter Data Quit

# Development, Deployment, and Testing of a Commercial Vehicle Safety System

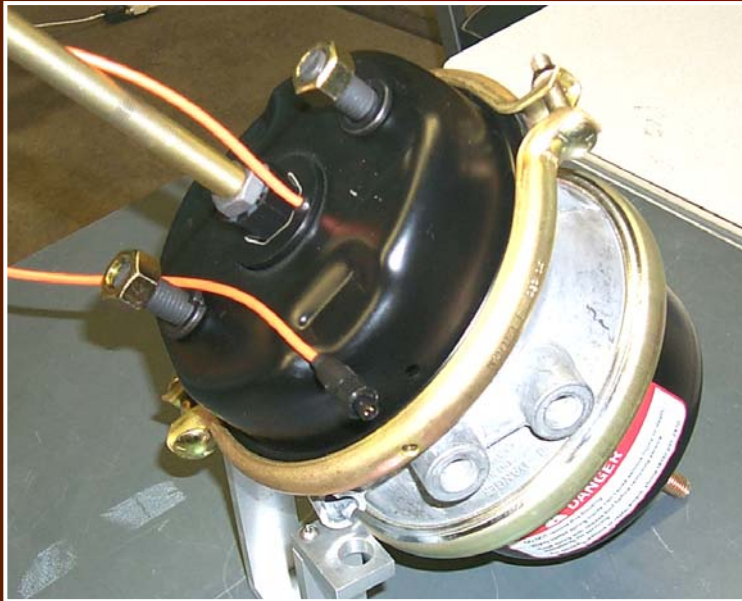


# Capabilities of the Onboard Safety System

- Automated Vehicle Location—Vehicle Tracking
- Automated Collision Notification
- Automated Brake Stroke Monitoring
- Engine Diagnostics

# Calspan Brake Stroke Sensor

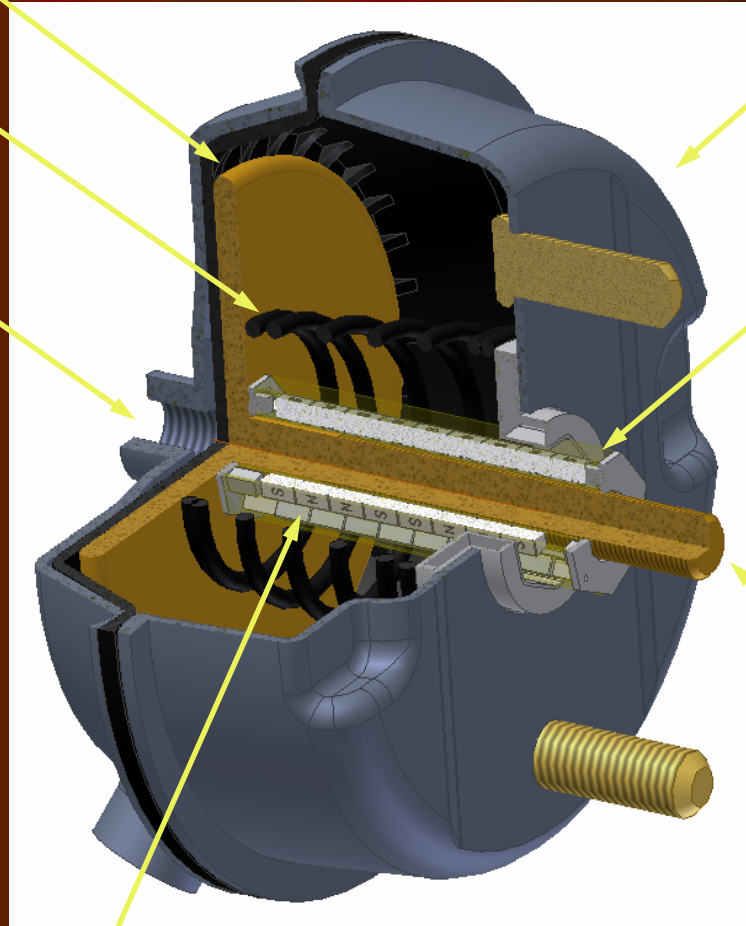
BSS Resolution= 0.075"



Diaphragm

Return Spring

Air Supply



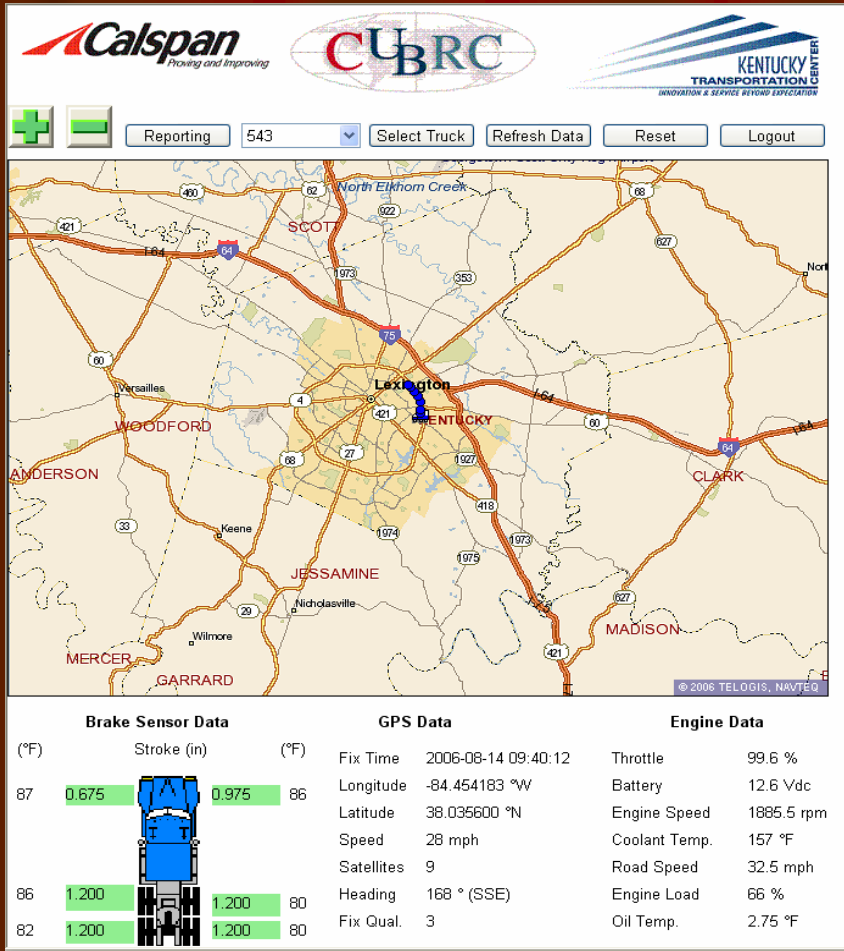
Brake Chamber

Sensor Tray

Pushrod

Magnetic Cylinder

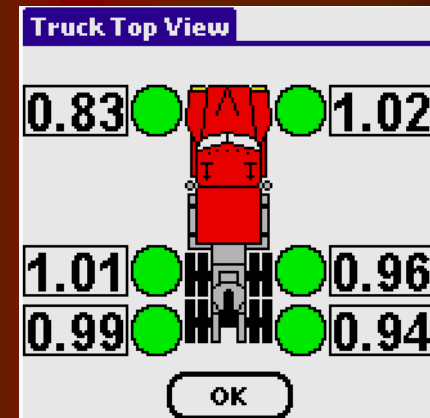
# Brake Stroke Status



Web Site Display






Driver Interface – Palm Pilot

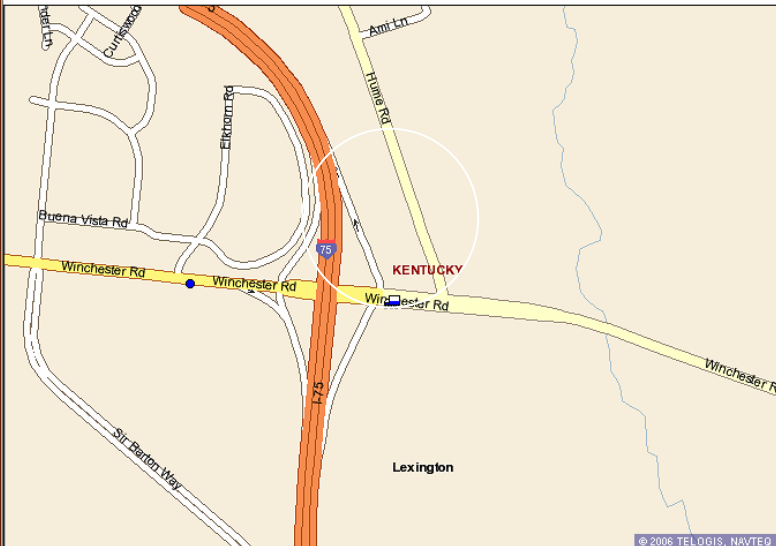


Palm Pilot Display


# Automatic Vehicle Location

Reporting 543
Select Truck
Refresh Data
Reset
Logout



© 2006. TELOGIS, NAVTEQ

Brake Sensor Data			GPS Data		Engine Data	
(°F)	Stroke (in)	(°F)	Fix Time	Longitude	Throttle	56 %
93	0.750	91	2006-08-14 09:55:47	-84.417983 °W	Battery	10.5 Vdc
			Latitude	38.040750 °N	Engine Speed	1331 rpm
87	1.200	86	Speed	37 mph	Coolant Temp.	92 °F
86	1.275	84	Satellites	8	Road Speed	43.5 mph
			Heading	93 ° (E)	Engine Load	55.5 %
			Fix Qual.	3	Oil Temp.	2.75 °F





# Vehicle Route Tracking

CVO Safety - Microsoft Internet Explorer

Address: <http://cvosafety.calspan.com/locations.aspx>

Navigation: Back, Main, 542, Reset, Logout

Start: 2006-06-13 06:00:00      End: 2006-06-13 14:00:00      [Generate Report](#)

06:00      14:00

June 2006						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
28	29	30	31	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	1
2	3	4	5	6	7	8

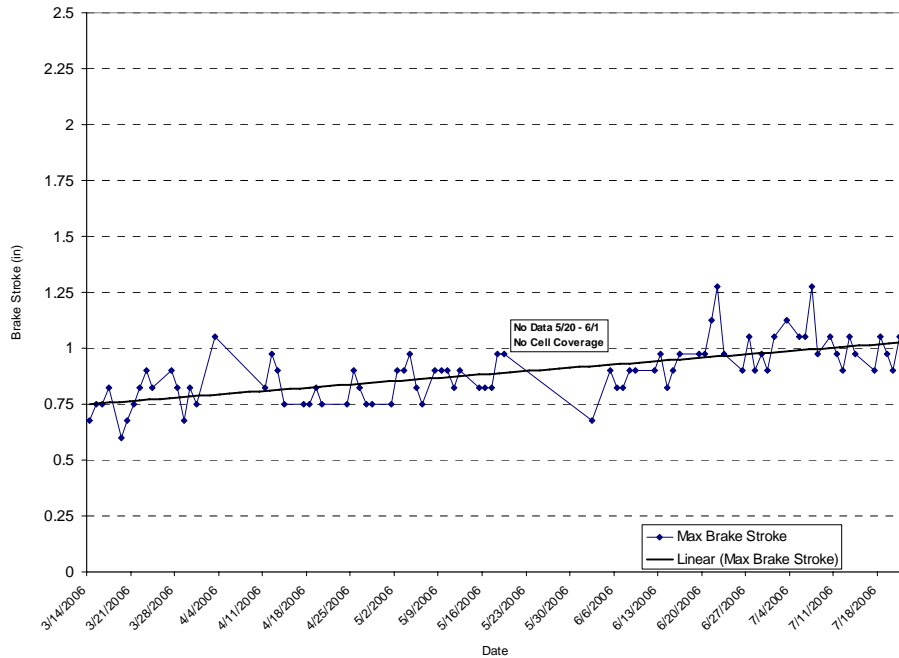
June 2006						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
28	29	30	31	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	1
2	3	4	5	6	7	8

Done

Track Driver Route using website "Reporting" Tools

# Graphical Presentation – *Max and Average Brake Stroke*

Maximum Brake Stroke  
Vehicle 542 Brake 1



Daily Average Brake Stroke  
Vehicle 542 Brake # 1

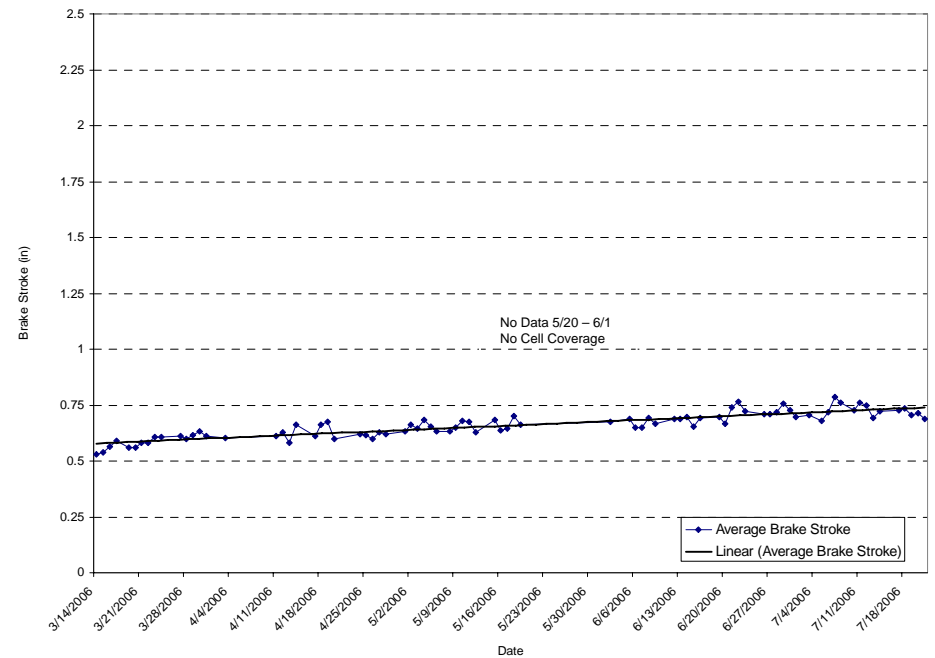
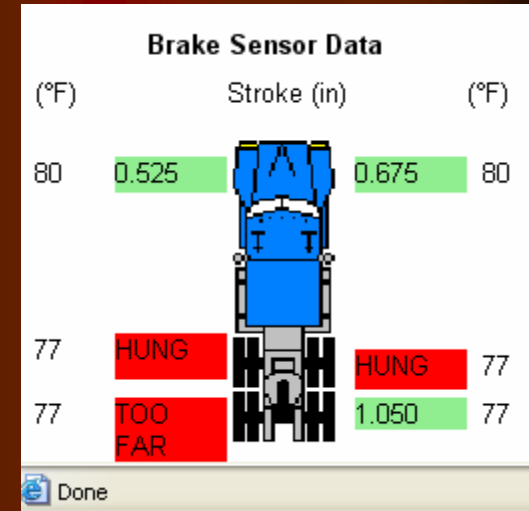
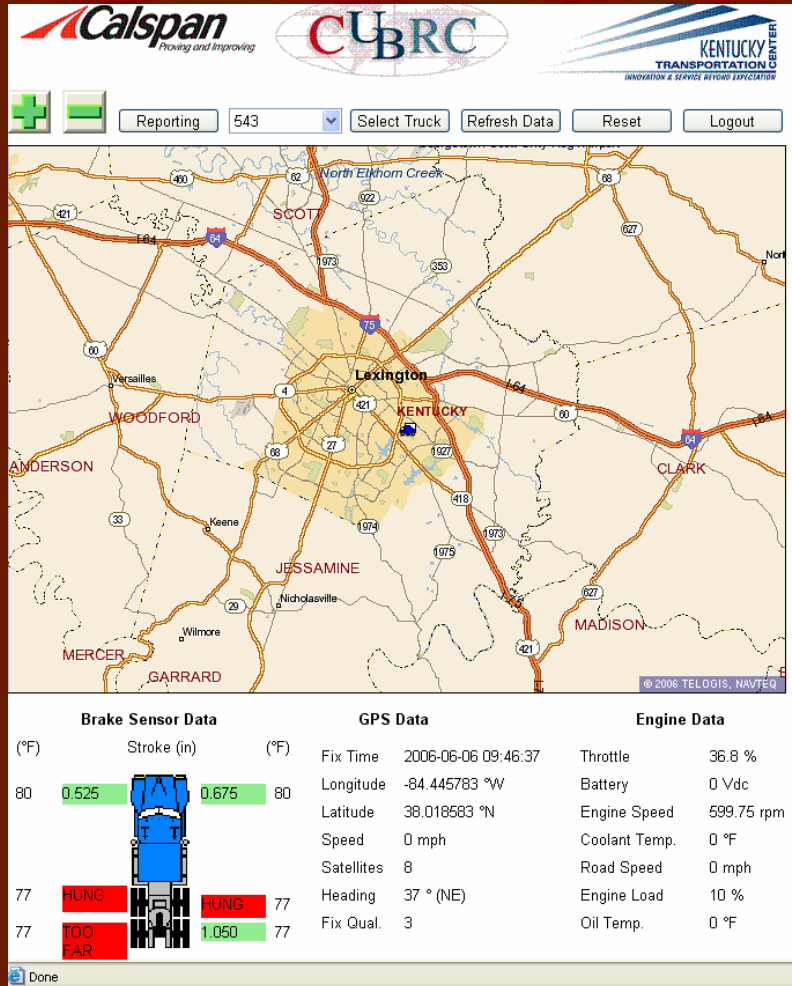


Chart max and average brake stroke through data reduction

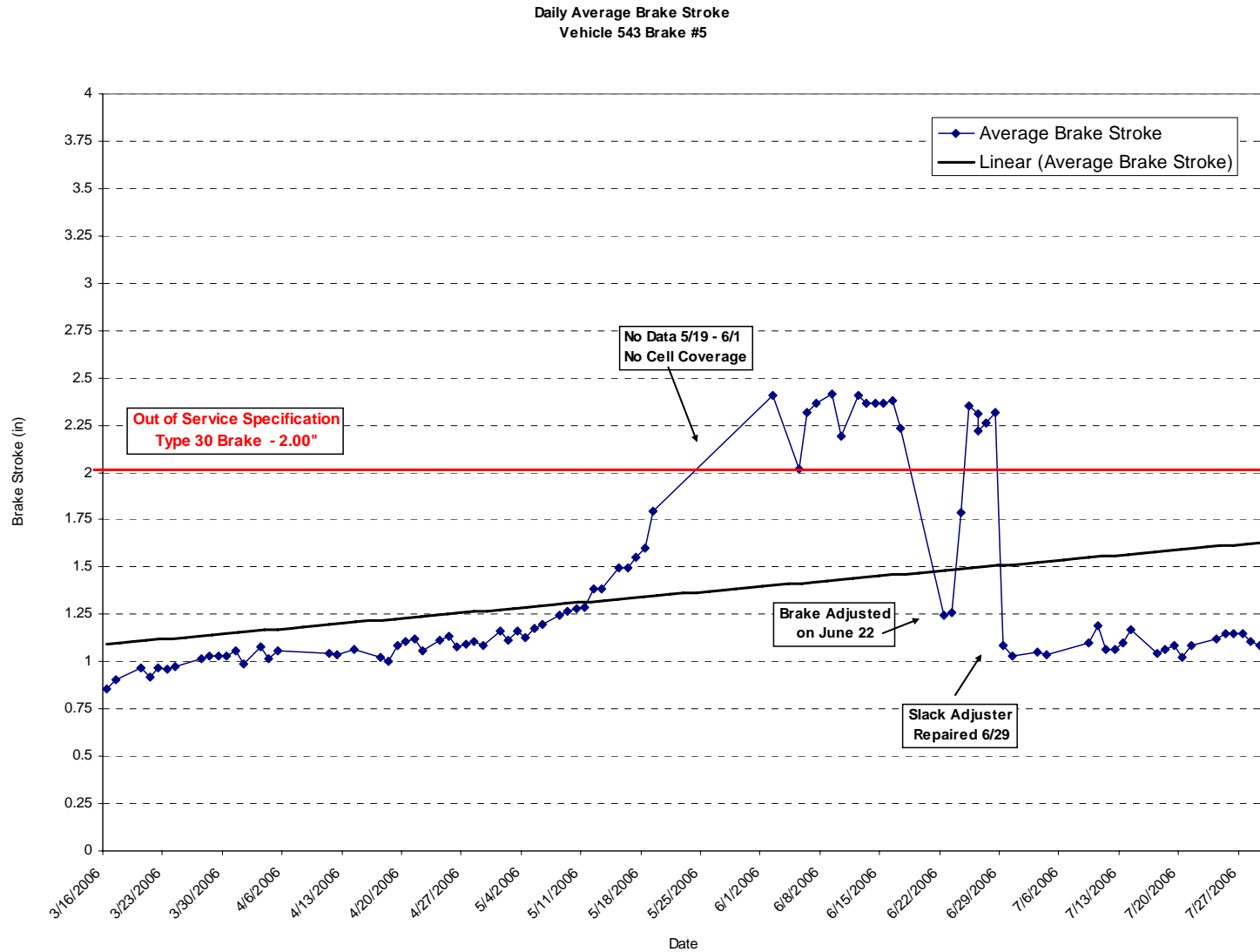
max brake stroke = 1.30 m pad wear

# MILESTONE: “Real World” Incident Identification



**“Too Far” message was an indication to check brake # 5. It was determined that brake # 5 had an automatic brake adjuster not functioning properly.**

# Brake # 5 – Average Brake



# The Integrated Safety and Security Enforcement System (ISSES)



# ISSES Technologies

- Radiation Detectors
  - To detect any radioactive materials (alpha or gamma radiation) passing through the weigh station.
- License Plate Reader
  - Camera with optical character recognition (OCR) capability to automatically read license plates.
- USDOT Number Reader
  - Camera with OCR capability to automatically read USDOT numbers.
- Infrared Monitoring of Brakes
  - Infrared camera to allow rapid identification of trucks with brake deficiencies.

# ISSES Photos

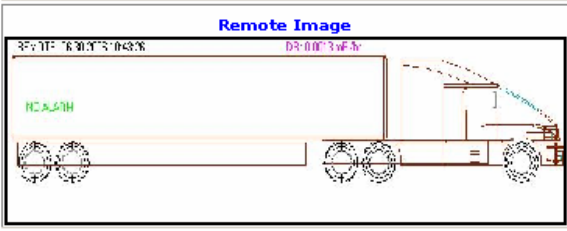
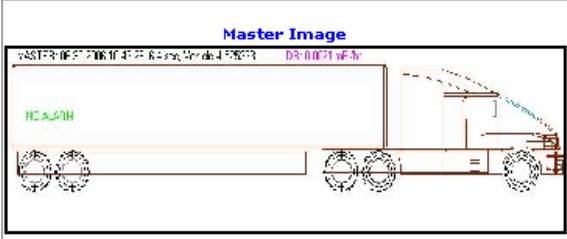




Click here if you want to , [Logout](#)

[Management](#)      [Monitoring](#)  
[Live View](#)      **[ALERT Only View](#)**      [Search](#)  
 You are at [Search](#) >> [Summary Details](#)

- [Search](#)
- [Summary](#)
- Details
  - [Plate](#)
  - [USDOT](#)
  - [RAD](#)**
  - [Thermal](#)
  - [Rad Handheld](#)
  - [Weight](#)

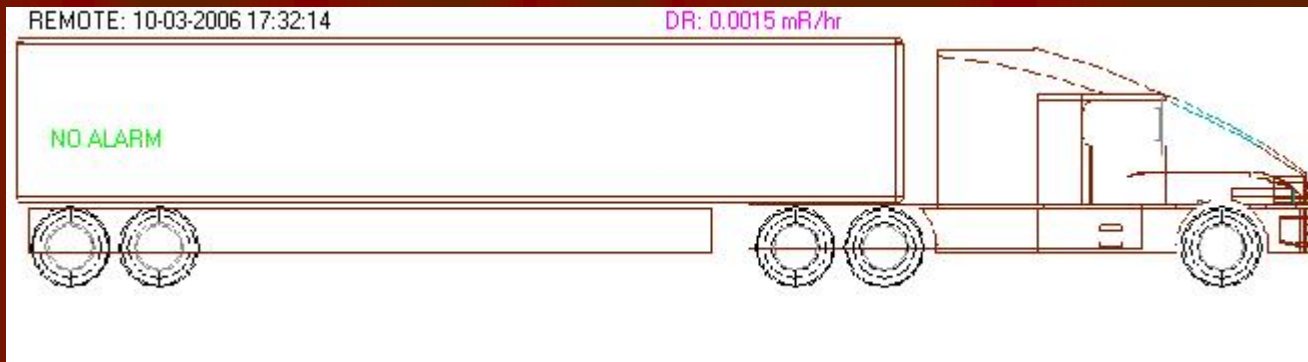


<b>License Plate :</b>	<b>LIB8654</b>
<b>USDOT # :</b>	<b>098583</b>
<b>Radiation :</b>	<b>Master: 1233412, Remote: No Alarm.</b>
<b>Thermal:</b>	- Not Available -
<b>Video:</b>	- Not Available -
<b>Met Data:</b>	- Not Available -
<b>Location Data:</b>	- Not Available -
<b>Driver Data:</b>	- Not Available -
<b>Manifest Data:</b>	- Not Available -

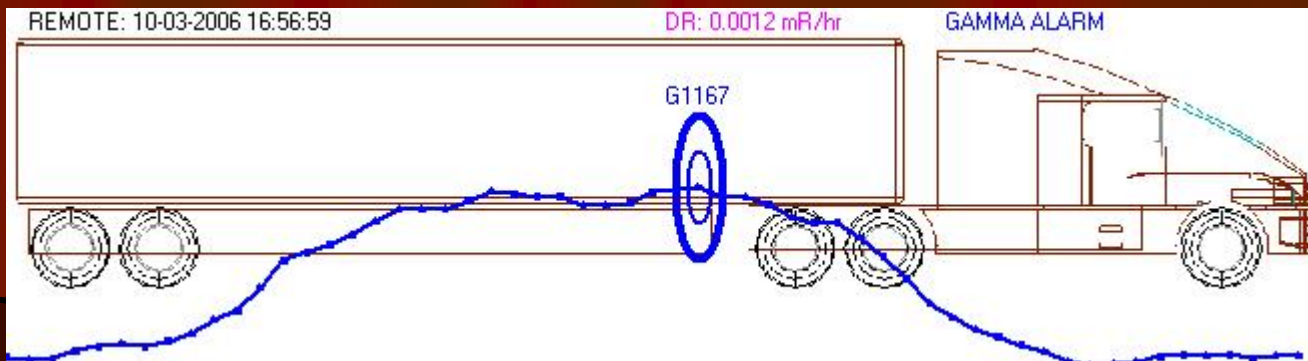
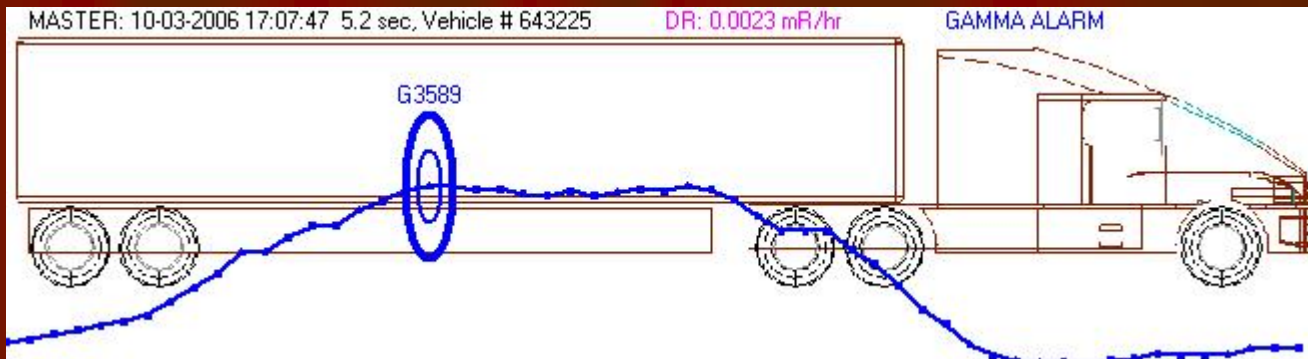


# Sample Radiation Profiles

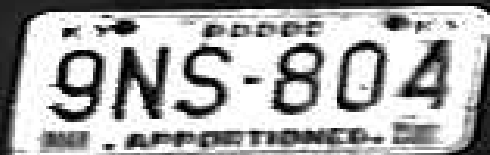
## No Alarm



## Alarm



# Sample Images from LPR System



9NS-804  
APPORTIONED



P378521  
APPORTIONED  
ILLINOIS



342800



PVE 2875  
APPORTIONED



9NS-028  
APPORTIONED

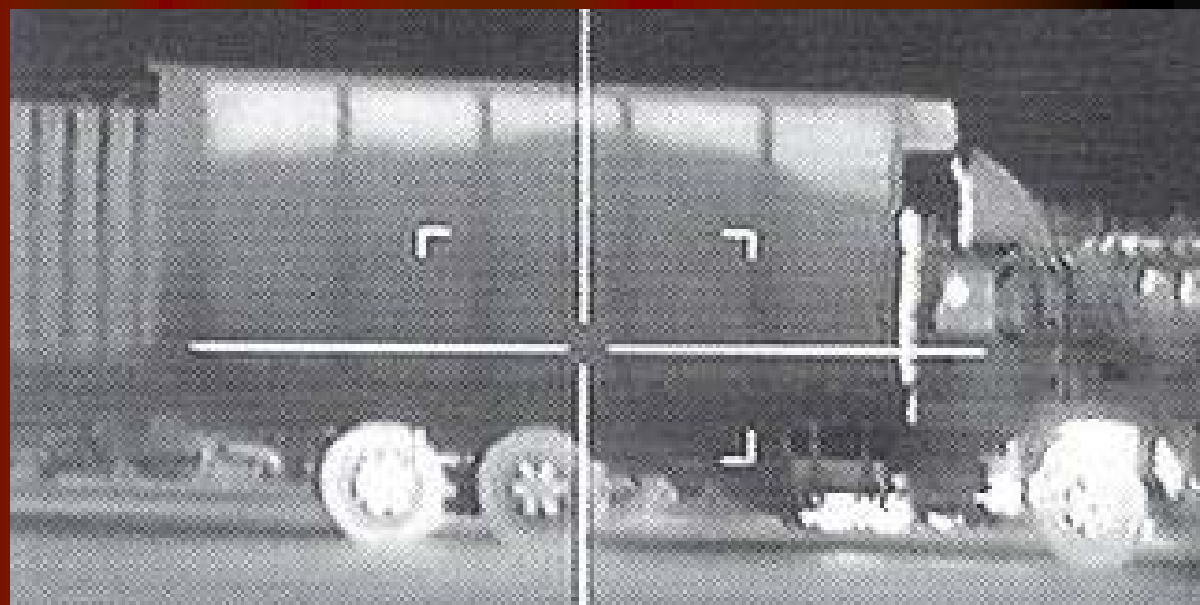


02706HT  
APPORTIONED

Sample Images from USDOT Number Reader (with results superimposed)



# Sample Infrared Image



# ISSES Project Status

- System installed at:
  - Northbound Laurel County (I-75)
  - Kenton County (southbound I-75)
  - Simpson County (northbound I-65)
- Operational procedures being developed and refined
- System to be evaluated by Kentucky Transportation Center and by Battelle

# What's On the Horizon?

- Commercial Vehicle Information Exchange Window (CVIEW)
- Expanded CVISN
- Mobile ISSSES
- Next-Generation Virtual Weigh Station

# CVIEW

- Kentucky is in the process of procuring a Commercial Vehicle Information Exchange Window (CVIEW)
- Provides similar functionality to the Kentucky Clearinghouse, with the following additional capabilities:
  - Exchanges data with the Safety and Fitness Electronic Records (SAFER) system.
  - Includes vehicle-level snapshots

# Expanded CVISN

- Kentucky currently developing an “Expanded CVISN Program Plan”
- Expanded CVISN provides a marvelous opportunity to “push the envelope.”
- Kentucky anticipates focusing on:
  - “Next generation” virtual weigh station
  - New technologies for roadside identification
  - Integration of roadside systems with safety and credentials databases



# Mobile ISSES

- Funding has been allocated for Kentucky to purchase two mobile ISSES units.
- Will provide same functionality as the three current ISSES installations, but will be mounted on vans.
- Will allow this safety and security monitoring to be performed wherever it is needed.

# “Next Generation” Virtual Weigh Station

- Plan to use LPR and USDOT Number Reader technology in conjunction with weigh-in-motion scales.
- Will provide a more automated system.
  - Won't require constant monitoring.
  - Can provide an alarm when a problem is detected.

# Thanks!

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