



Remote Sensing Presentation for Joint Commission on Technology and Science



Environmental System Products
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December 6th, 2010





Remote Sensing



Pioneered by University of Denver scientist and advanced commercially by ESP.



Provides instant measurement of tailpipe emissions.



Quickest and most convenient form of emissions testing available.



1990 Clean Air Act (CAA) amendments allow states to use remote sensing to complement their I/M programs.





Remote Sensing – How Does it Work?



Driving toward a cleaner, safer future.™

RSDs (remote sensing devices) are set up at strategic locations; site evaluation and planning are key to meeting goals.

RSDs instantly measure tailpipe emissions as motor vehicles pass through ultraviolet and infrared light beams cast across a roadway.

RSDs measure vehicles exhaust in less than one second.

RSDs measure four regulated pollutants: Carbon Monoxide (CO), Hydrocarbons (HC), Nitrogen Oxide (NO) and Particulate Matter (PM).

RSDs can measure more than 3,000 light duty vehicles per hour during peak collection periods.





Rugged Hardware

Adapted for on-Road



Hardware: www.esp-global.com

I - Site Information
M - Mirror Alignment
C - Calibration
S - Statistics
R - Road Testing
Y - Replay
F1 - Help
F2 - Setting

SPEED = 37.5 mph ACCELERATION = 2.5 mph/sec
CO = 0.2% CO2 = 11.1 % HC = 135 ppm NOx = 321 ppm

- 3 active systems collect all relevant information in less than 1 second.
- Hold the cursor above any button to highlight the components of a system
- Click for a description of system operation

Speed & Acceleration
Exhaust Emissions
Camera Capturing

Size of equipment enlarged for presentation purposes



Remote Sensing Equipment



Gas Analyzer - Source/Detector Module

Weather Station

The Corner Cube Mirror (CMM)

Speed/Acceleration System

Video Camera for License Plate Capture

Computer Console

PC Screen View



Remote Sensing Typical Applications



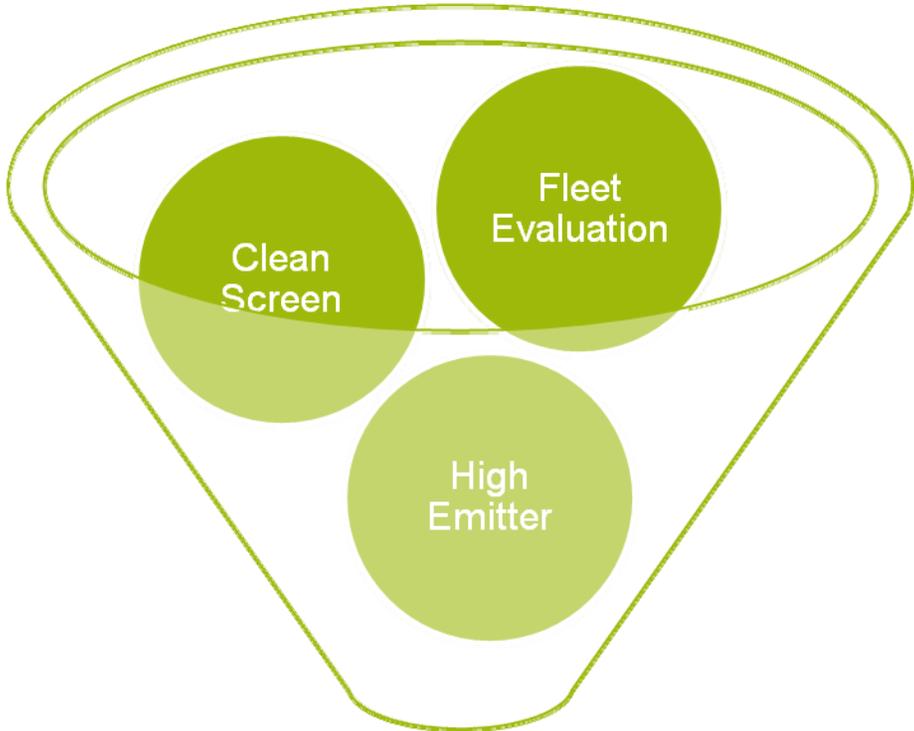


RSD Typical Applications



Fleet Evaluation

Remote sensing is used to monitor in-use fleet emissions and evaluate program effectiveness.



High Emitter

Vehicles identified as "gross" or "high" polluters are notified and subject to further testing and subsequent repair.

Clean Screen

Very "clean" low emitting vehicles are identified and exempt from their next scheduled emissions inspection.

Total Screen

Combination of both Clean Screen and High Emitter

Total Screen



Public Outreach



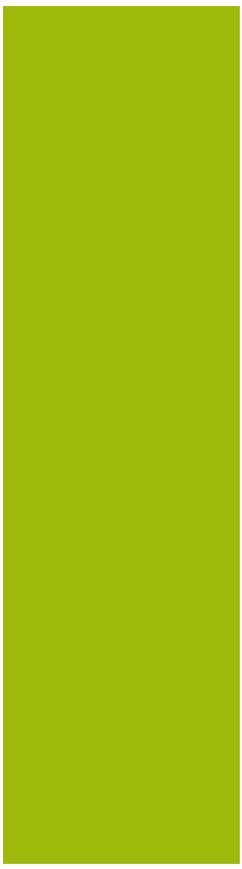


Clean Screen





What is Clean Screen





Clean Screen Notification



COLORADO VEHICLE LICENSE
RENE WALSTADT 00000

ARAPAHO COUNTY RECORDER
% TRACY K. BAKER
PO BOX 9011
LITTLETON, CO 80160-9011

PRESORTED FIRST-CLASS MAIL
U.S. POSTAGE PAID
LITTLETON, CO
PERMIT# 0536

PLACE EMISSIONS STICKER ABOVE THIS LINE IF APPLICABLE

PEEL OFF ABOVE LABEL AND PUT IT ON YOUR OWN ENVELOPE. VIN

10 CO	PAS-GEN TYPE	000ABC PLATE #	1902 YR	TOY MAKE	2D BODY	AB1CD23E4F567890 VIN	UNIT #	00/00/1900 PUR DATE	00 C WT
00A000000	G	SEP-2001	1200	25.00	50.00	1.00	\$76.00 TOTAL AMOUNT DUE		
TITLE	FUEL	EXPIRES	TAX VAL.	*EM.FEE	LIC. FEE	OWN. TAX			

Visit our website at
<http://www.arapahoecr.com>

* PASSED ROADSIDE EMISSIONS.

*****AUC**5-DIGIT80013
JACK AND JILL
12345 MAIN ST.
ANYTOWN, USA 00000

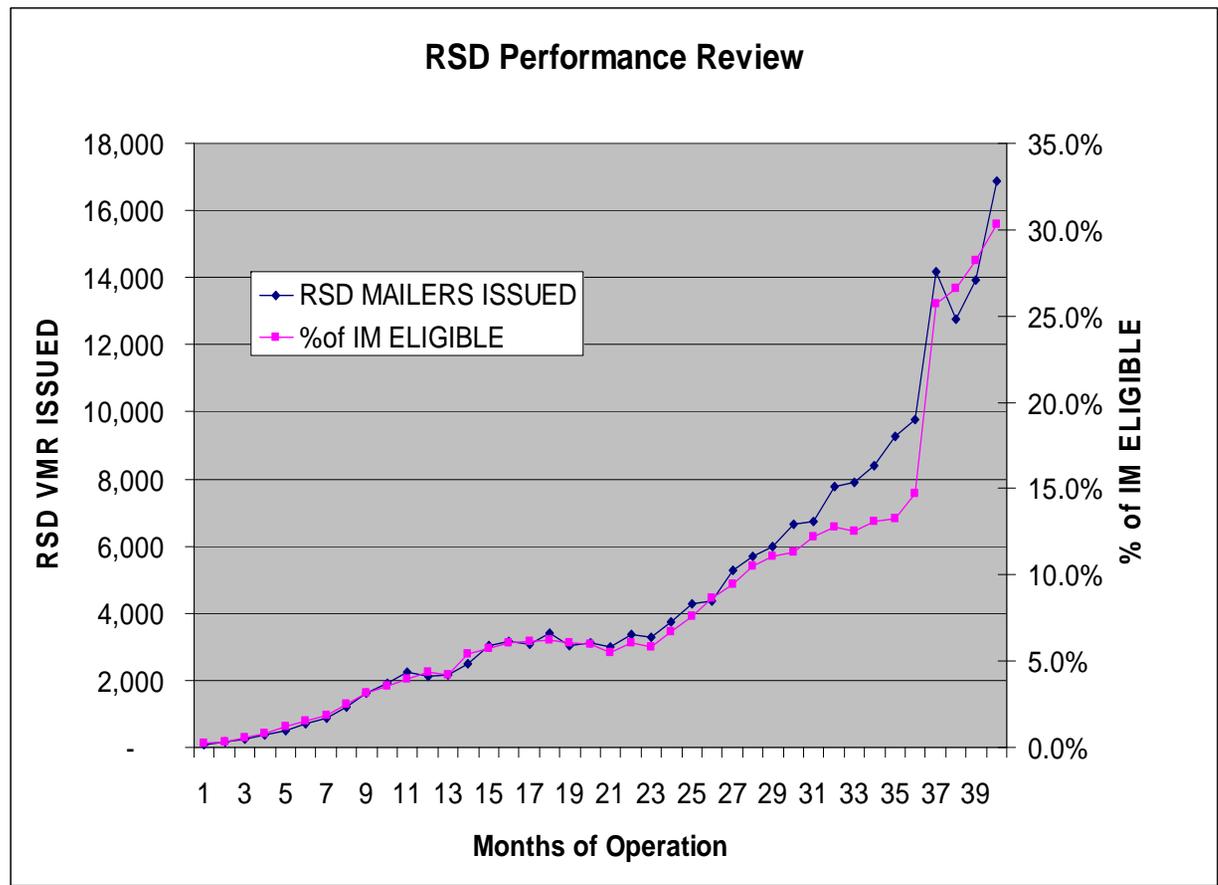
(9 PT ARIAL)



Colorado Clean Screen Performance



- Total Avg. Annual Eligible for CS; 689,000
- RSD: 35-40% of the eligible fleet / month.



85% of eligible consumers chose to participate in the program.

Since the inception of the Denver Metro Area (DMA) program ESP has issued over 900,000 Clean Screens in the state of Colorado.



Remote Sensing High Emitter

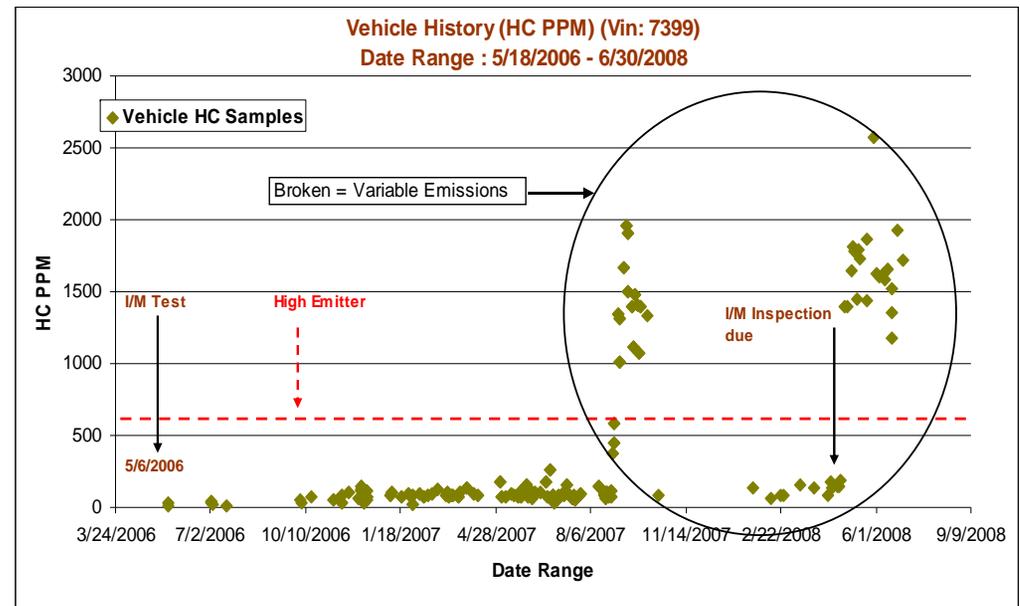


High Emitter Identification



- Long term remote sensing vehicle emission testing program provides the coverage to quickly identify high emitting vehicles.

- Identify high emitters for “off-cycle” repair / replacement.
- Implement / supplement a smoking vehicle program.

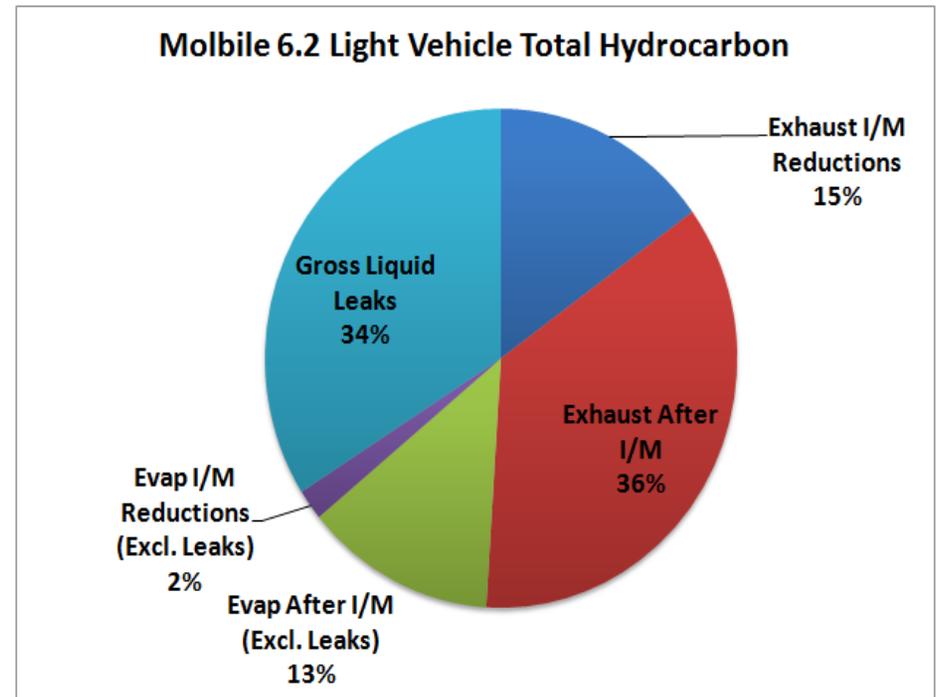




Gross Liquid and Evaporative Emission Identification

esp

- Contributes 49% of Gross Liquid and Evaporative Leaks.
- RSD recently recognized by the USEPA as a potential tool to identify on-road high evaporative emission leaks.
- Current VA pilot program.



Same data that is used for clean screen may also be used for all other applications, including evaporative emission data. No additional cost to consumers or the state – it is the same data set!

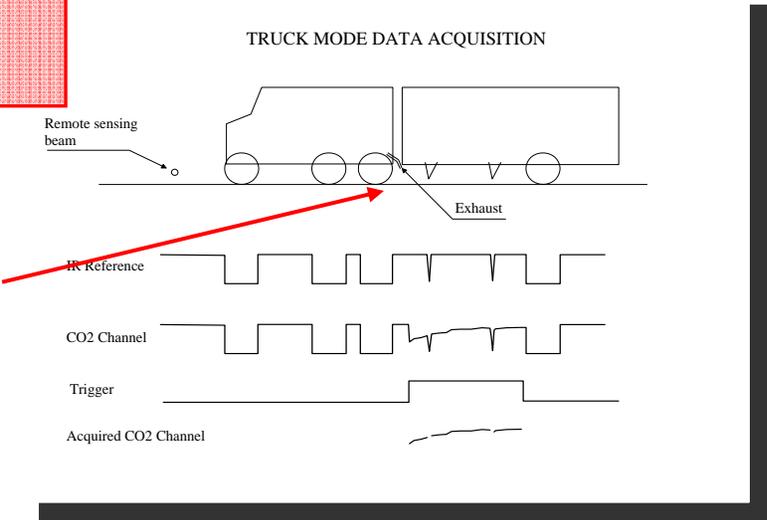


Heavy Duty High Emitter Identification



Low Exhaust Pipe Vehicle

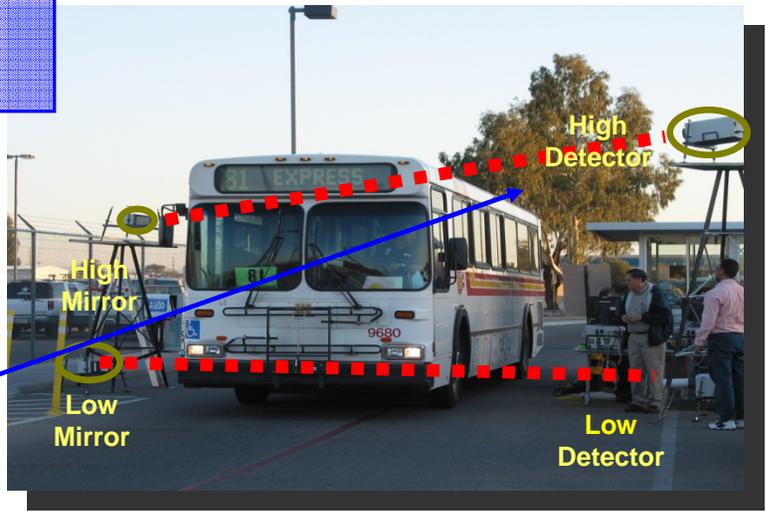
Measure Under Trailer



High Exhaust Pipe Vehicles

Measure Over Trailer

Measure Behind Bus



High Detector

High Mirror

Low Mirror

Low Detector



Conclusion



- ESP has collaborated with Virginia DEQ since 2002 to advance remote sensing applications in the state
- 1990 Clean Air Act (CAA) amendments allow states to use remote sensing to complement their I/M programs.
- Clean Screen is a convenient form of emission testing designed to reward customers with clean-running low-polluting vehicles.
- Clean screen is a voluntary alternative to a traditional station based vehicle emission inspection.
- Consumer funded clean screen program provides the data for all other remote sensing applications – it is the same data set.
- Remote sensing is an excellent tool for detecting high emitters including evaporative emissions and evaluating Inspection and Maintenance (I/M) programs.
- Remote Sensing can be easily adopted into new areas designated as non-attainment.
- Clean screen offers a 100% reduction in total inspection time.