

Alternative Non-Intrusive Traffic Detection Technologies

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2007 Baltimore-Washington Regional Signal Forum

March 14, 2007

Objectives

- ❖ Discuss Technology
- ❖ Identify Traffic Data Types
- ❖ Identify Traffic Data Applications
- ❖ Emphasize Capability and Limitations
- ❖ Debate Experience/The Audience

Why Non-Intrusive Detections Systems

- No Lane Closures
- Minimum Risk of Exposure
- Easy Maintenance
- Less Expensive for Multiple Lanes
- Better for Temporary Applications
- Better for Cyclical Applications

Traffic Data Types

Often Collected

- Traffic Volumes (by lane)
- Vehicle Axle Classifications (13 axles)

Not Often Collected

- Speeds
- Length
- Lane Occupancy



Traffic Data Applications

Intersection-Based Analysis

- Traffic Volumes (lane volume)

Arterial-Based Analysis

- Lane Counts/Volumes/Axle Classifications
- System Counts (Speed, Lane Occupancy)

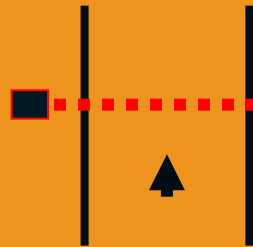
Freeway-Based Analysis

- Lane Counts/Volumes/Axle Classifications
- System Counts (Speed, Lane Occupancy)

Tube Configurations

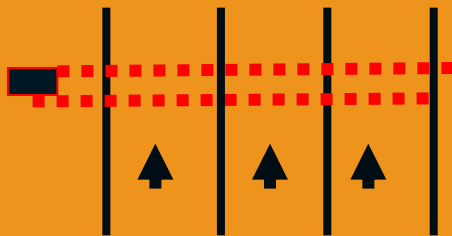
Tube Layout

Single Lane (V)



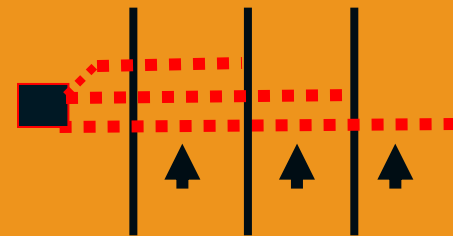
Class 4 - Buses

Multiple Lanes (V,S,C)



Combine All Lanes

Multiple Lanes (V,S,C)

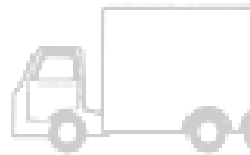


By Lane

Class 1 - Motorcycles

Class 2 - Passenger Vehicles

Class 3 - Four Tire



Class 5 - Two Axle, Six Tire

Class 6 - Three Axle

Class 7 - Four or More Axle

Class 8 - Four or Less Axle

Class 9 - Single Unit



Class 10 - Six or More Axle Trailers



Class 11 - Single Unit

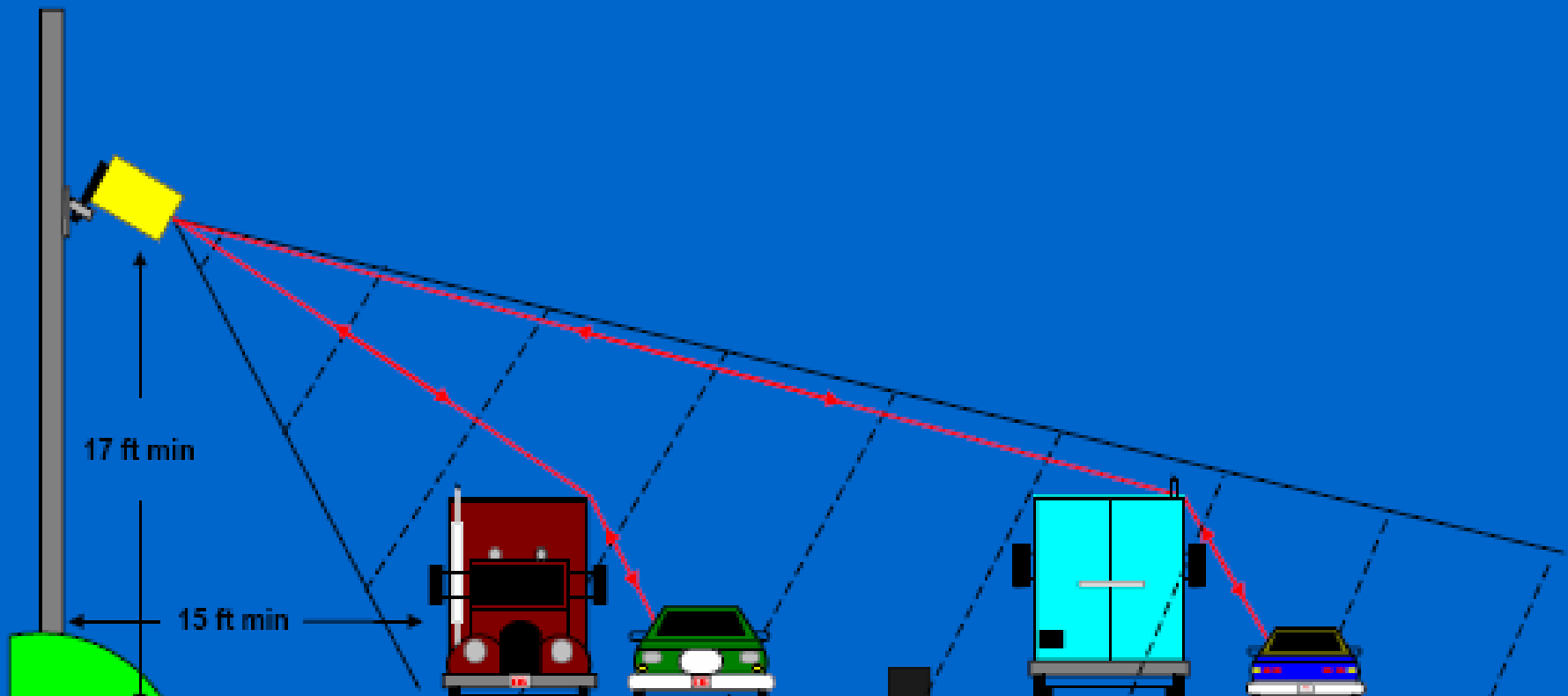
Class 12 - Six Axle Multi Trailers

Class 13 - Seven or More Axle Multi Trailers

Non-Intrusive Detector Configurations

User-Programmed for Multiple Lane Detection

Same Installation; Same Configuration



Microwave Detector

■ Microwave Technology

Strengths:

Accuracy, easy to install, no lane closure, side-fire, off-site calibration, low cost, retrofit in ex. Structures, solar and wireless, not weather impacted, meets FHWA requirements

Constraints:

- Sensitive installation
- Classifies by length only, 6 classes
- May have problems with speeds below 5 mph



RTMS (Remote Traffic Microwave Sensor) radar

Other Microwave Detectors

■ Microwave Radar

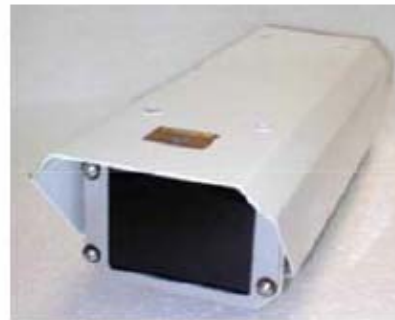
- Presence
- Passage
- Volumes
- Speed
- Lane Occupancy



RTMS multizone presence-detecting microwave radar. (Photograph courtesy of Lawrence A. Klein).



SmartSensor multizone presence-detecting microwave radar. (Photograph courtesy of Wavetronix, Provo, UT).



Loren multizone presence-detecting microwave radar. (Photograph courtesy of Electronic Control Measurement Inc, Manor, TX).

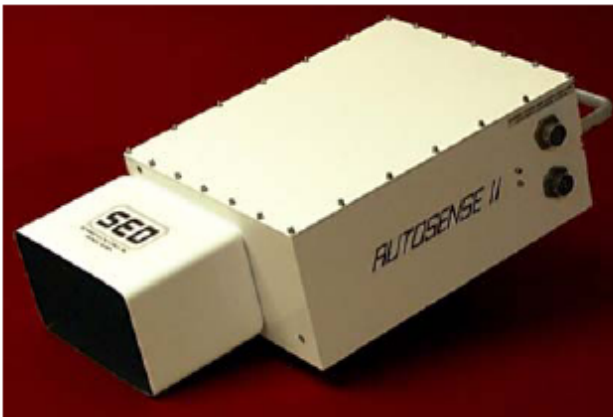
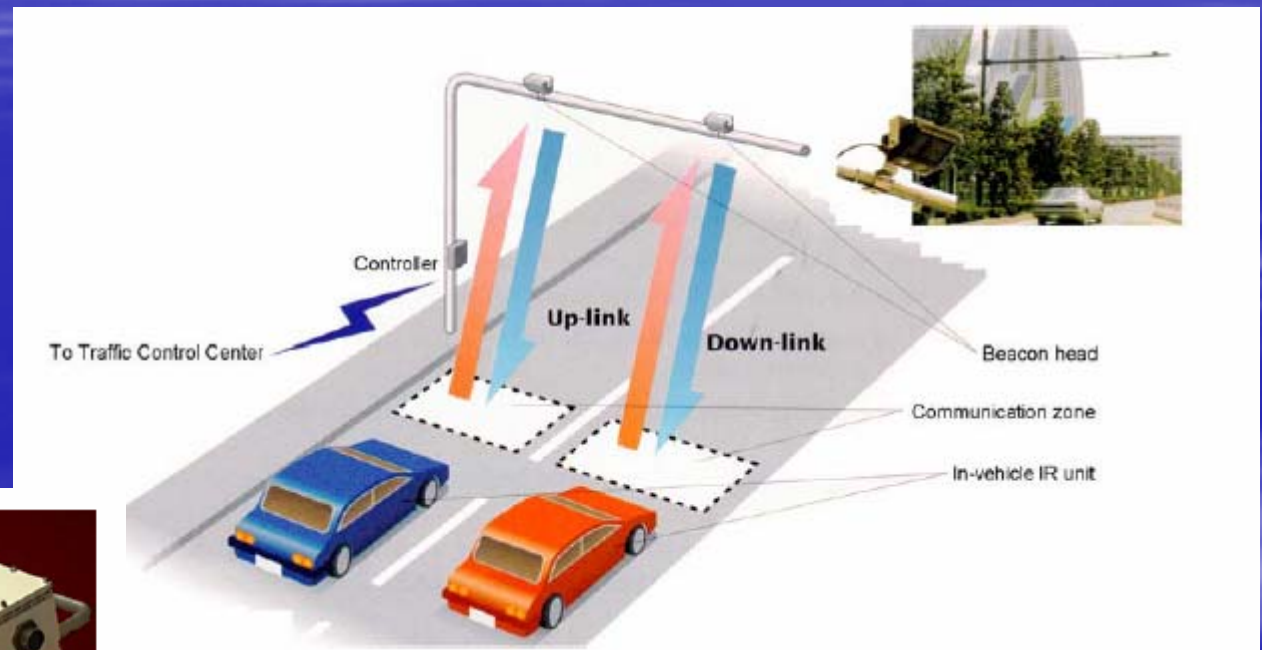


150LX single zone presence-detecting microwave radar. (Photograph courtesy of Naztec, Inc., Sugar Land, TX).

Infrared Detection

- Infrared/Laser

- Volume
- Presence
- Speed
- Length
- Peds

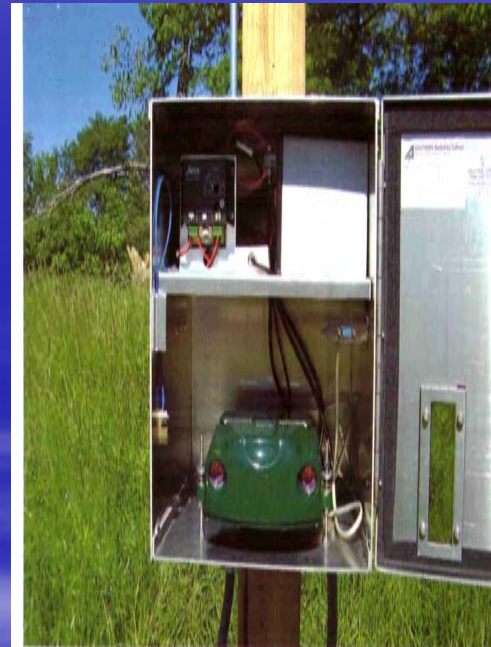


Infrared Detector/Axle Classifier

- Infrared/Laser
 - Volume
 - Presence
 - Speed
 - Axle Class

Strength: Axle Classifications, volumes, speeds

Weaknesses: Cost and high maintenance of laser beam (snow and grass clearance)



Acoustic Detector

- **Acoustic**
 - ✓ **Strengths:**
Similar to
Microwave
 - ✓ **Weaknesses:**
Cost, per lane
coverage, not
very reliable for
low speed



SmartSonic acoustic sensor. (Photograph courtesy of IRD, Saskatoon, SK)

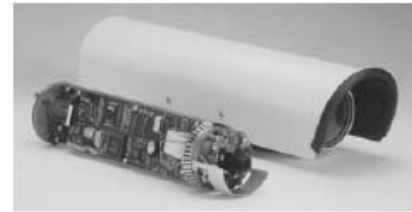


Video Detection

- Video Imaging Detection
 - Volumes
 - Speed
 - Length
 - Visual Classification



(a) Autoscope 2004
(Photographs courtesy of Econolite Control Products, Anaheim, CA)



(b) Autoscope Solo



(c) Traficon VIP 3 (Photograph courtesy of Traficon, Heule, Belgium)



Constraints: Maintenance of Lens

Study Findings

Non-Intrusive detections systems are very capable of meeting your needs

Classification Counts

- 13-Classes not Required
- Axle Classes & Vehicle Lengths can be correlated
- 6 Vehicle lengths meet the HPMS Requirements
- Pavement Design needs MU classes and no more
- Other States have received FHWA approval for following the vehicle-length classification

Recommendations

- **Assess your needs for data types**
- **Assess your maintenance capability**
- **Consult with current users**
- **Request real demonstrations**
- **Perform a cost analysis**
- **Look for local vendors/tech. support**

Thank You

Questions!!