



Federal Motor Carrier Safety Administration
Office of Analysis, Research, and Technology

Federal Highway Administration
Office of Freight Management and Operations

2008 Smart Roadside Workshop

Wireless Roadside Inspections for Trucks and Buses

Jeff Loftus, FMCSA

Jeff.loftus@dot.gov



The Problem

- ◆ Truck numbers & mileage grow each year while roadside safety inspection resources remain constant
- ◆ The likelihood of a roadside inspection is far less than a truck being weighed
 - 3 million annual truck inspections with a **73% Violation rate (25% OOS rate)**
 - 177 million weigh inspections (staffed & WIM) with 515,587 citations – a **0.29% violation rate**
 - 82 million weigh inspections (staffed)
 - 95 million weigh inspections (WIM)



WRI Program Vision & Goal (The Solution)



◆ Vision

- Motor Carrier safety could be improved through dramatic increases in roadside safety inspections due to wireless inspections using proven technologies and processes.
- Driver and vehicle safety assessments occur frequently enough to ensure compliance while minimizing disruptions to safe and legal motor carrier transportation.

◆ Goal

- Demonstrate and measure government and industry benefits and costs of a Wireless Roadside Inspection network across a multi-state region to enable a “go/no go” decision for nationwide deployment.



WRI Program Vision (The Solution)

- ◆ Motor Carrier safety could be improved through dramatic increases in roadside safety inspections due to wireless inspections using proven technologies and processes.
- ◆ Driver and vehicle safety assessments occur frequently enough to ensure compliance while minimizing disruptions to safe and legal motor carrier transportation.





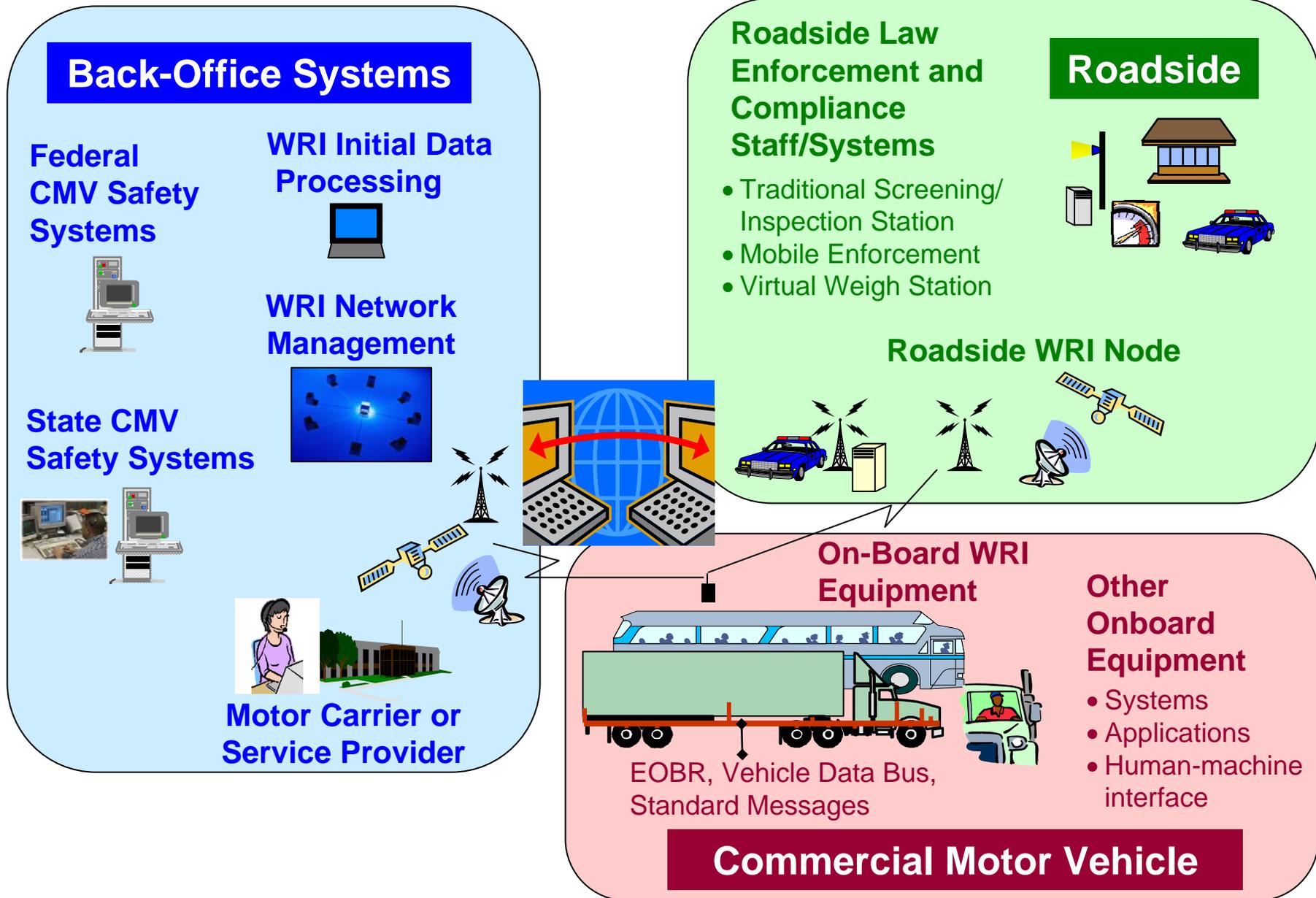
Opportunities for Technology

- ◆ Analysis of historical inspection data reveals that a large portion of significant “defects” are limited to a few items
- ◆ With the exception of load-securement, most of the key vehicle and operator condition criteria lend themselves to onboard electronic monitoring and diagnostic assessment

Driver Violations	% Driver OOS Violations
Logbook	40.0%
HOS	28.7%
CDL	19.4%
Total	88.1%

Vehicle Violations	% Vehicle OOS Violations
Brakes	41.2%
Lighting	16.6%
Tires	9.4%
Load Securement	15.7%
Total	82.9%

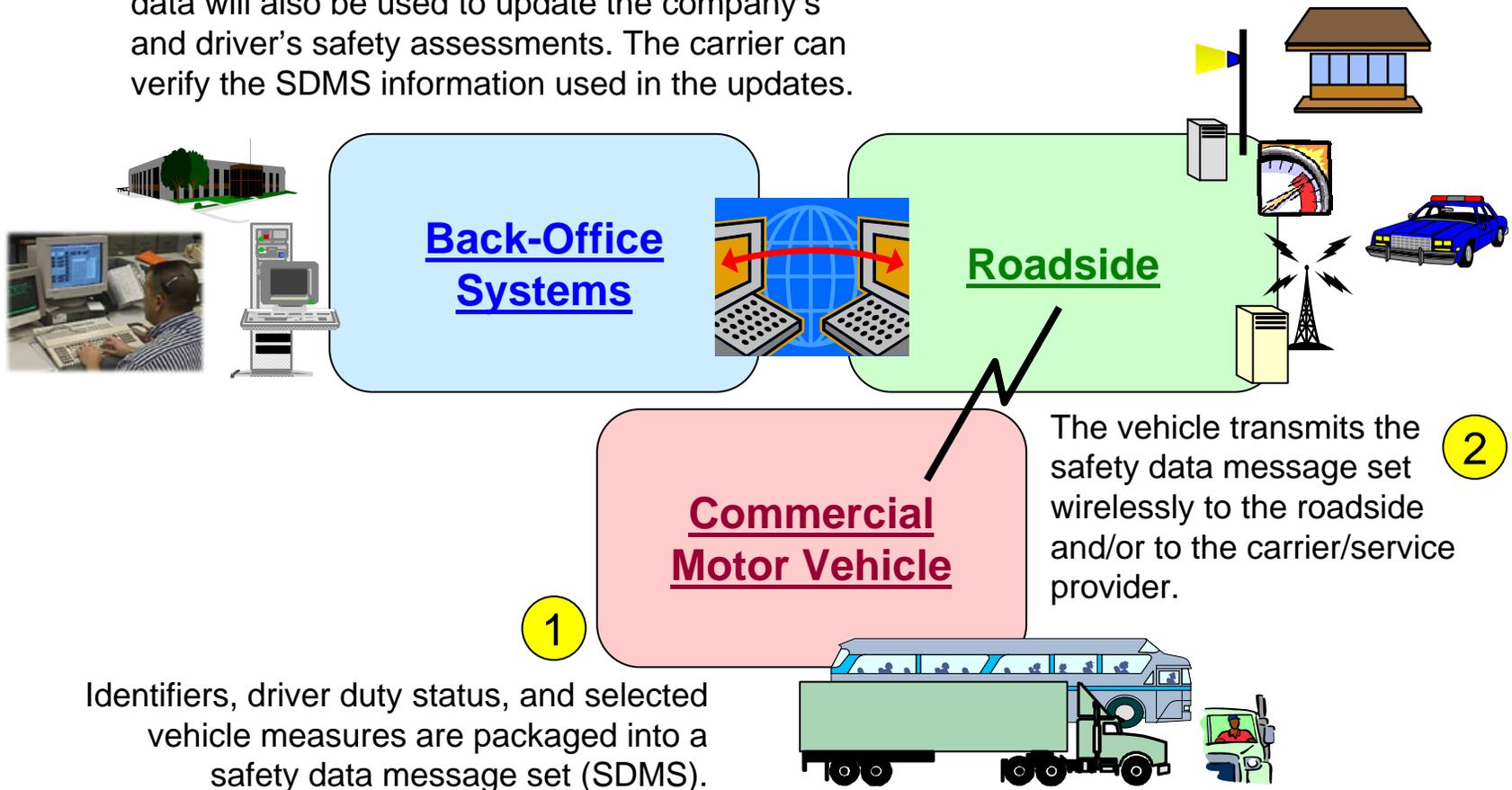
Wireless Roadside Inspection System Overview



WRI Concept: Communications Path A

Vehicle-to-Roadside (transceiver)

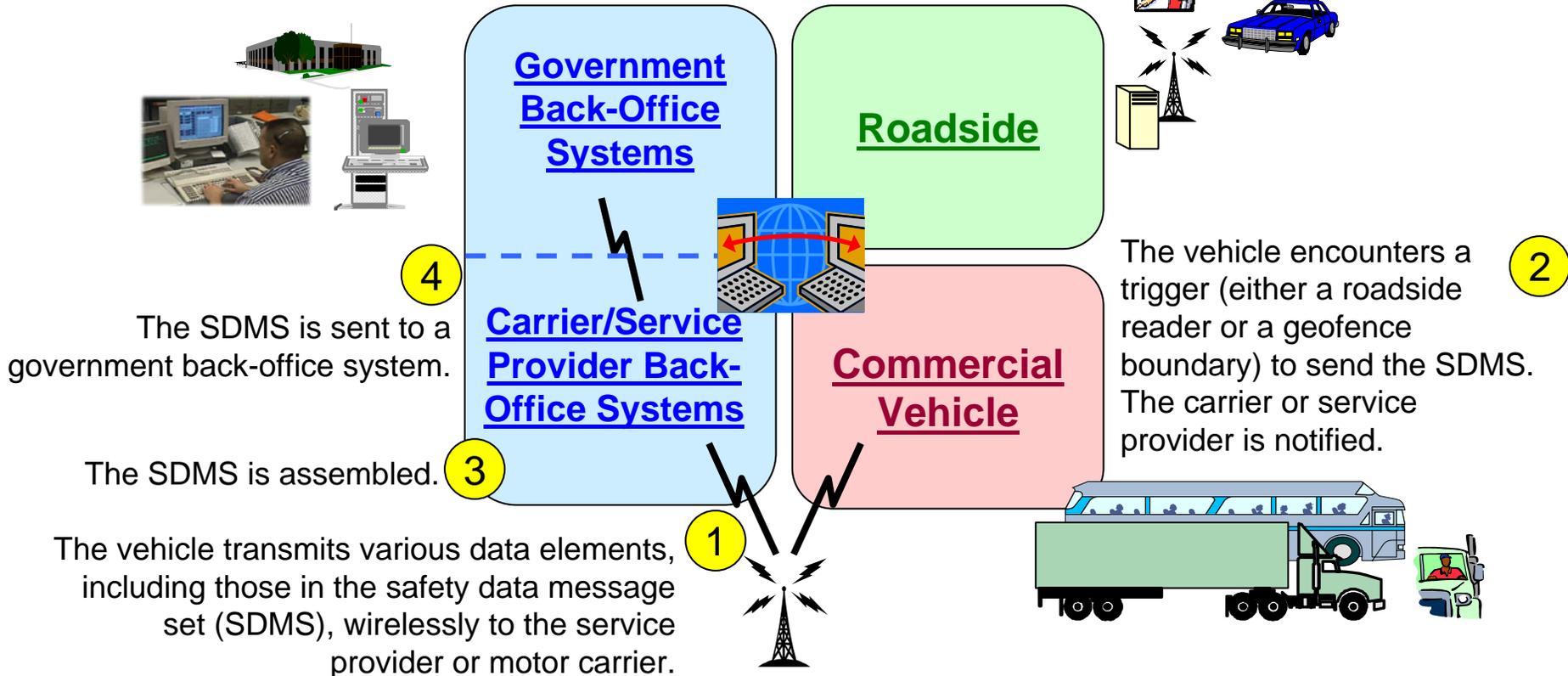
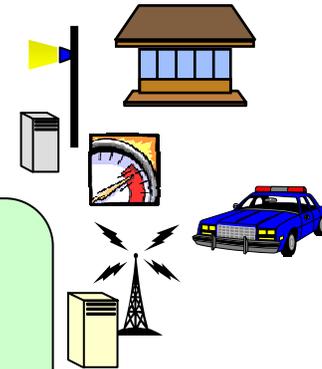
- 3 The safety data message set is verified, archived, and distributed. It may be used for real-time enforcement, compliance, and assessment. The data will also be used to update the company's and driver's safety assessments. The carrier can verify the SDMS information used in the updates.



WRI Concept: Communications Path B

Carrier/Service Provider to Government Systems (CMRS)

- 5 The safety data message set is verified, archived, and distributed. It may be used for real-time enforcement, compliance, and assessment. The data will also be used to update the company's driver's safety assessments. The carrier can verify the SDMS information used in the updates.



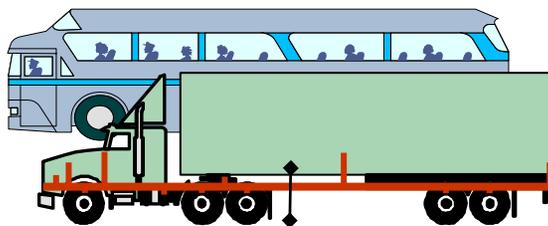
Conceptual Safety Data Message Set (SDMS) Contents

Identifiers

Driver license jurisdiction and ID
Vehicle identification number (VIN)
Vehicle unit number
Vehicle license plate jurisdiction and ID
Motor carrier/coach USDOT number
Shipping document ID
Equipment (e.g., trailer) ID

Vehicle Measures

Brakes
Tire pressure
Vehicle location
Weight



Electronic On-Board Recorder (EOBR) Data

Driver's Log
(Duty Status + Location of Duty Status Change over time)

Vehicle Status

Lighting
Safety belt

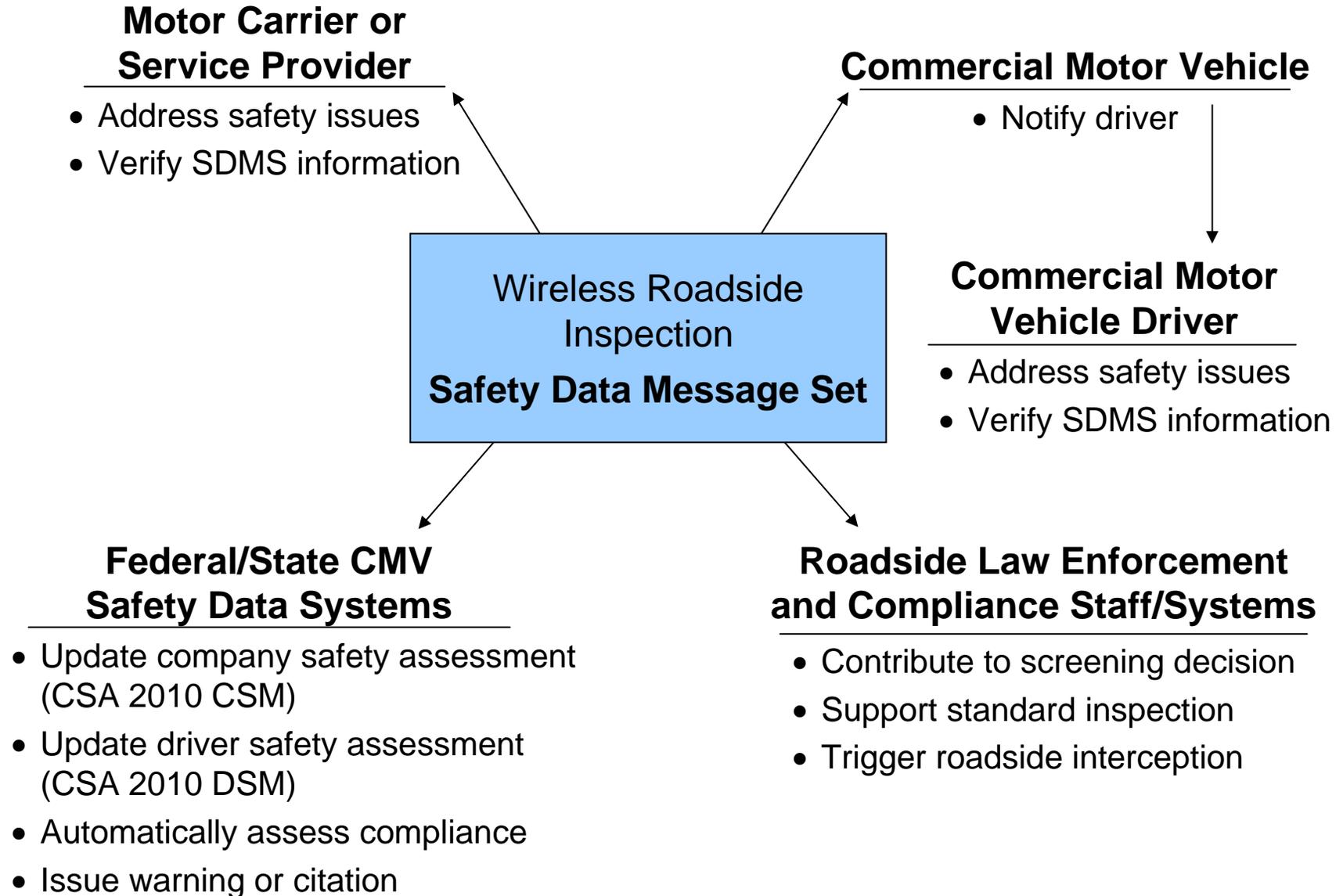
Data Bus:

SAEJ1708/SAEJ1587, SAEJ1939

Additional Vehicle Measures or Status

Cargo (incl. HazMat)	Collision warning	Container	Coupling
Driver performance	Emissions	Exhaust system	Fuel system
Steering	Suspension	Trailer	Wheels
Wipers	Other		

Wireless Roadside Inspection System: Major Uses of Safety Data Message Set (SDMS) Information





Driver

Name John Doe One

CDL #: 123456789 State: TN

Carrier

Name Commercial Carrier Consultants

USDOT #: 1628871

ISS Rating 84

Vehicle



Make: Freightliner Year: 2005
License Plate #: TN20474HZ State: TN
VIN #: 1FUJA6AV95LU33071

HOS

On-Duty Time Available: 7:1:57
Driving Time Available: 7:1:57

Alerts

High ISS rating: 84
Driver's license has been revoked
Vehicle's registration is expired

Weight

Net 31577
Steer: 12841
Drive: 8932
Trailer: 9804

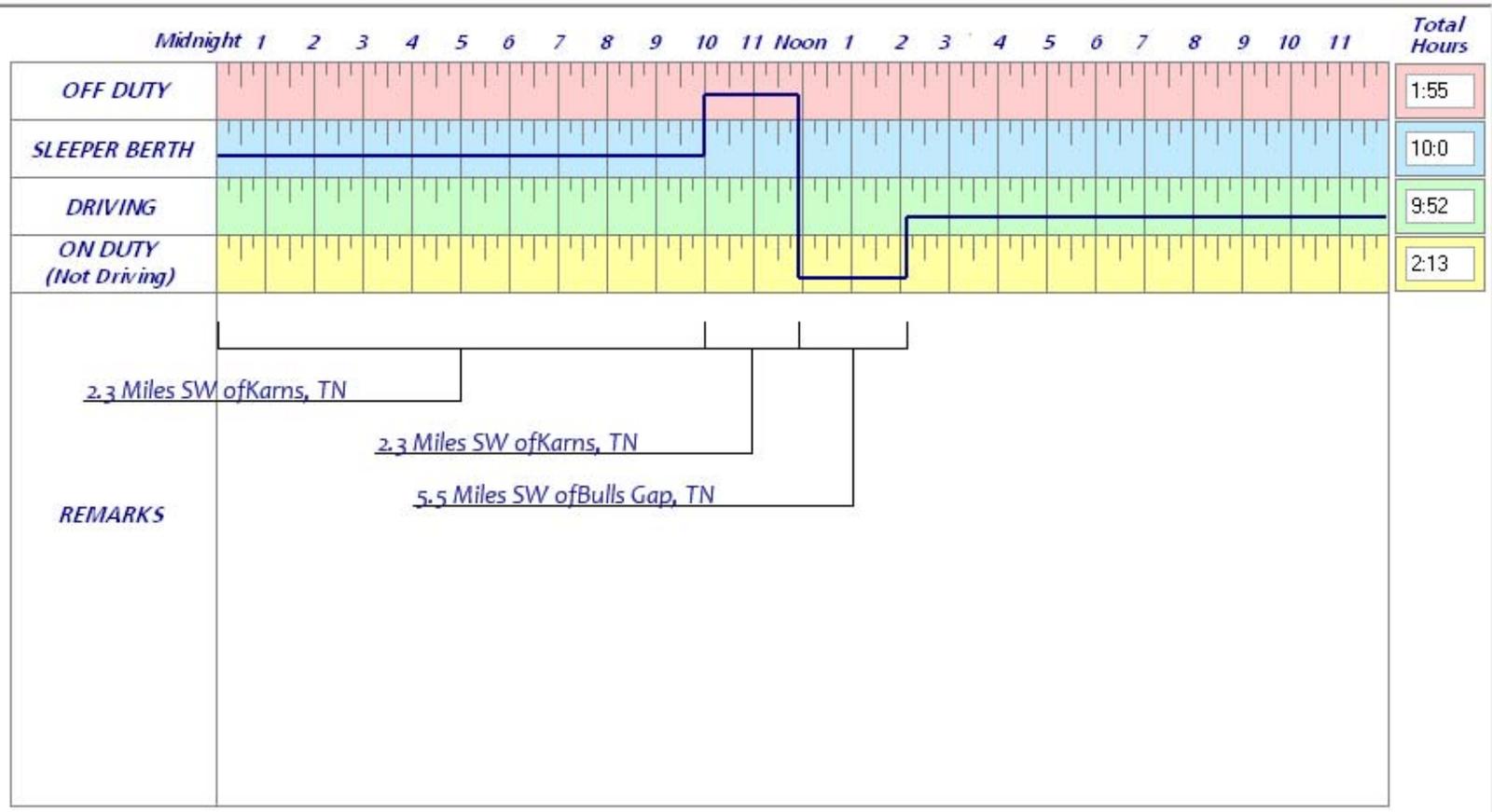
Dismiss

Quick Save

Quick Save and Dismiss



← Yesterday 8/7/2007 →

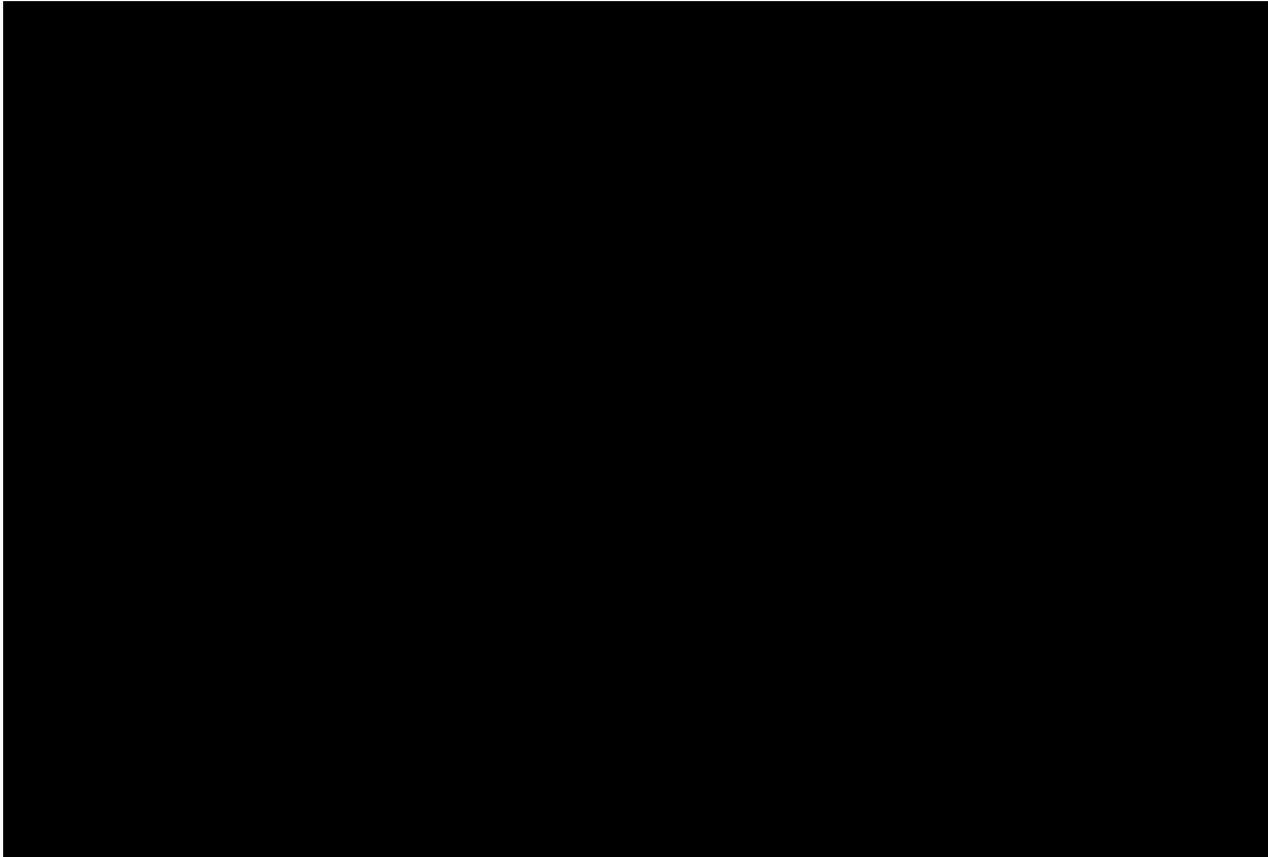


9:3
On-duty hours today
70 Hour/8 Day
46:50
Total hours on duty last 7 days, including today.
23:9
Total hours available tomorrow.
53:47
Total hours on duty last 8 days, including today

60 Hour/7 Day
44:21
Total hours on duty last 6 days, including today.
15:38
Total hours available tomorrow.
46:50
Total hours on duty last 7 days, including today



WRI Video





Estimated Costs & Benefits*

◆ Costs

- Public sector annual costs of \$45M – \$76M
- Private sector annual costs of \$224M – \$395M
 - \$533 – \$940/vehicle
 - 420,000 new vehicles equipped per year

* *Development and Evaluation of Alternative Concepts for Wireless Roadside Truck and Bus Safety Inspections*, FMCSA, 2007. <http://www.fmcsa.dot.gov/facts-research/research-technology/report/wireless-inspection-report.pdf>



Benefits Assumptions

- ◆ Dramatic Paradigm Shift
 - Electronic safety checks will be frequent and expected
 - Number of unsafe CMV drivers and vehicles on road would be reduced
 - Crashes related to unsafe CMV drivers and vehicle defects would be reduced
- ◆ Size & weight program comparison



Est. Benefit-Cost Ratio

ANNUAL BENEFITS

Annual Lives Saved	253
Annual Injuries Prevented	6,192
Total Annual Benefits (\$)	\$1.7B

ANNUALIZED COSTS

Government —Facility, Equipment, IT, Communications Capital Costs (Amortized over 10 years)	\$22M – \$34M
Government —Facility, Equipment, IT, Communications O&M Costs	\$23M – 42M
Industry —Annual Incremental CMV Costs (Based on 420,000 units/yr) (\$533 - \$940/CMV)	\$224M – \$395M
Total Annualized Cost	\$269M – \$471M

BENEFIT/COST RATIO

High – Low	6.17:1 – 3.51:1
Average	4.84 : 1

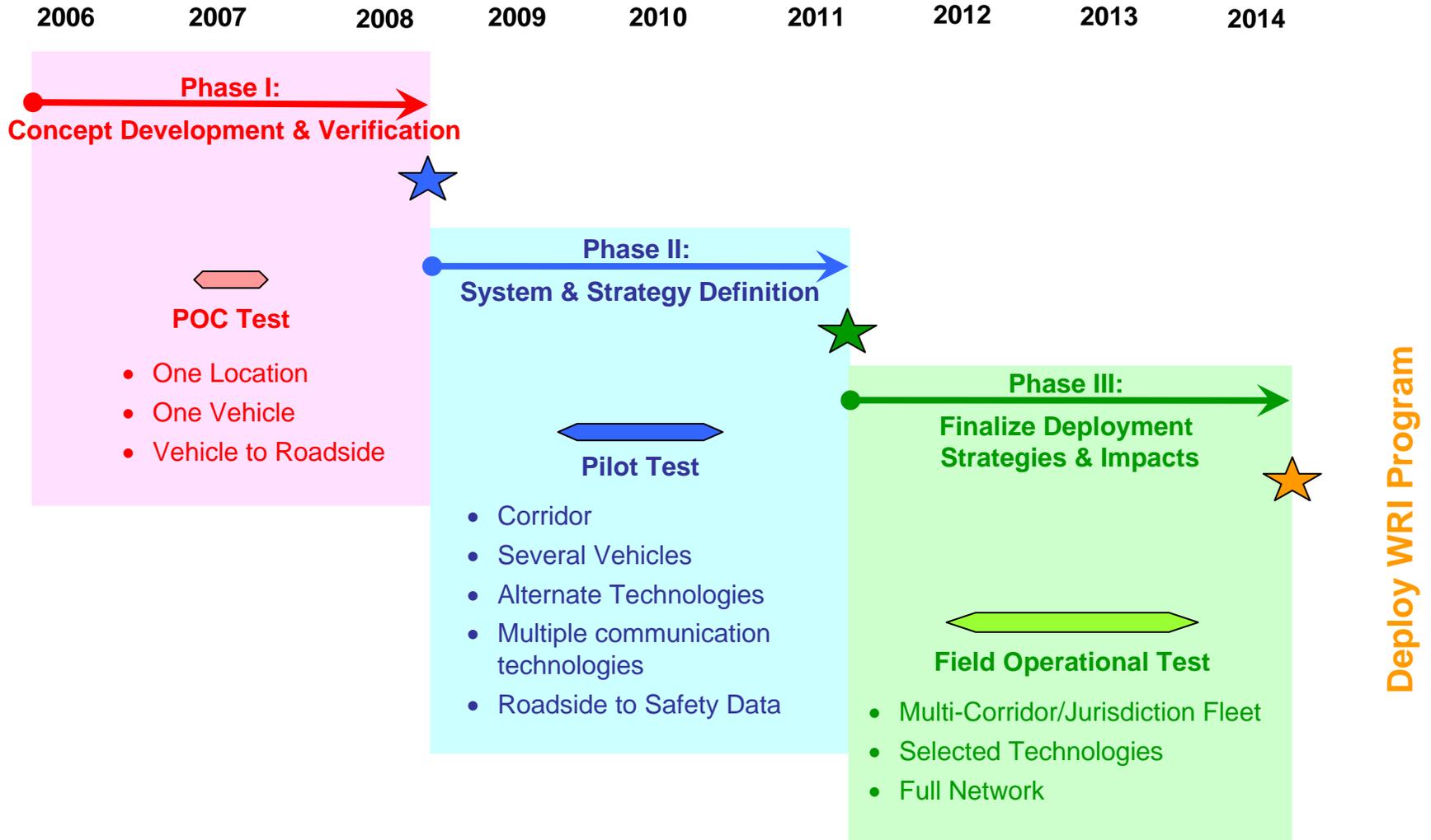


Additional Motor Carrier Benefits*

- ◆ PrePass Pre-clearance Weigh Station bypass system benefits (1997-2007)
- ◆ Fleets enrolled in PrePass saved over 10 years
 - 20 million hours in avoided delay
 - 120 million gallons of fuel
 - \$1.1 billion in operational cost savings (assuming \$5 per stop)
- ◆ Emissions reduction

* Source: Heavy Vehicle Electronic License Plate (HELP), Inc., www.cvo.com

WRI Program Phases & Schedule



☆ Go / No Go Decision Point



Relationship to Smart Roadside Initiative

- ◆ Improve safety and freight mobility through the application of information sharing and interoperable technology on the road;
- ◆ Focus enforcement resources on high-risk carriers, vehicles, and drivers;
- ◆ Reduce unnecessary delays for commercial vehicles.