

**Federal Motor Carrier
Safety Administration**

U.S. Department of
Transportation

Wireless Roadside Inspection Program Pre-Field Operational Test

Presented to

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WRI Program Vision & Goal

► Vision



- Motor Carrier safety improved through dramatic increases in roadside safety inspections
- Frequent driver and vehicle safety assessments ensure compliance
- Safe and legal motor carrier transportation not hindered
- Wide industry and public agency participation

► Goal

- Improved motor carrier safety (reduction in accidents) due to increased compliance (change in motor carrier and driver behavior) in response to a higher frequency of roadside safety inspections using wireless technologies.

WRI Potential Benefits & Incentives

- ▶ Improved safety of commercial motor vehicles (e.g. Trucks and Motor Coaches) and their operation
- ▶ Reductions in accidents resulting in lower:
 - Fatalities, injuries, and property damage
 - Overall congestion and delay
 - Emissions
 - Energy Use
- ▶ Increased productivity and mobility of the transportation system
 - Reduce delays at border crossings and other inspection points
 - Uniform and fair collection of user fees and taxes
- ▶ Increased security and livability

WRI Potential Benefits/Incentives to Industry

- ▶ Credit for positive inspections and safe operations
- ▶ Level playing field across operators
- ▶ Potential for good carrier/vehicle/driver to by-pass stations in a fully deployed system
- ▶ Transparency and real time monitoring of WRI results to carriers
- ▶ Reduced likelihood of physical inspection for participants leading to reduced delays, fuel use, and emissions
- ▶ Potential to reduce insurance costs and identify/minimize risk
- ▶ Optional ability to provide weight, brake, and tire status data for improved safety and operational efficiency

WRI System Major Use Cases



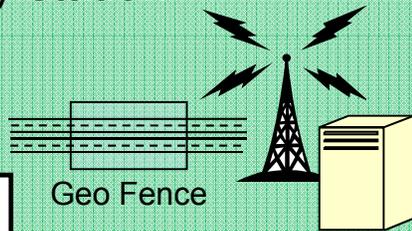
Screening support to
staffed fixed or
temporary station



Traditional
Inspection
Support



Carrier Use
of
the SDM



Geo Fence

Automatic compliance
assessment at
unstaffed roadside site

Planning
to test in
Pre-FOT



Safety Check
via

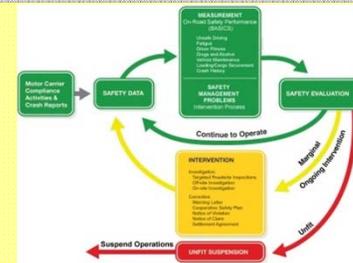
Mobile Enforcement

Not
supported
by Pre-FOT
technology



Routine Safety
Analysis
or Special Study

Would like
to test in
Pre-FOT
if possible



Feeder to Comprehensive Safety
Analysis Process

Comprehensive Safety Analysis

How
Comprehensive Safety Analysis (CSA)
Could be supported by WRI

Feeder to the Comprehensive Safety Analysis (CSA) Process

CSA is a major FMCSA safety initiative...

- ▶ A more comprehensive measurement system
- ▶ A safety fitness determination methodology based on performance data and not necessarily tied to an on-site performance review
- ▶ A broader array of progressive interventions

GOALS of CSA

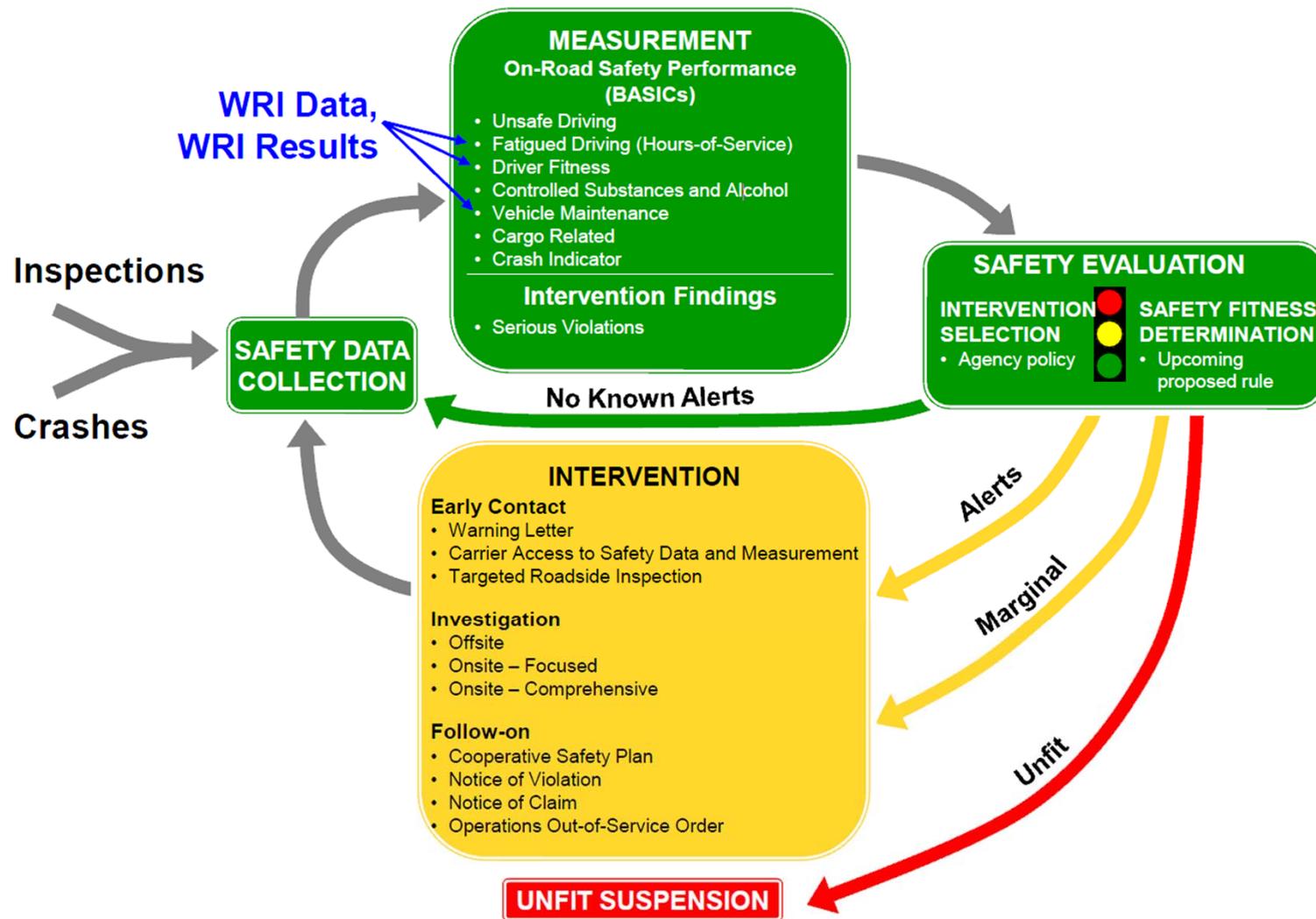
- ▶ Correct unsafe behavior early
- ▶ Reach a larger number of carriers & drivers
- ▶ Maximize efficiency and effectiveness of department resources
- ▶ Achieve greater reduction in large truck & bus crashes

Behavior Analysis & Safety Improvement Categories (BASICS)

- ▶ Unsafe Driving
- ▶ Fatigued Driving
- ▶ Driver Fitness
- ▶ Drugs/Alcohol
- ▶ Vehicle Maintenance
- ▶ Improper Loading/Cargo Issues
- ▶ Crashes

<http://csa.fmcsa.dot.gov/default.aspx>

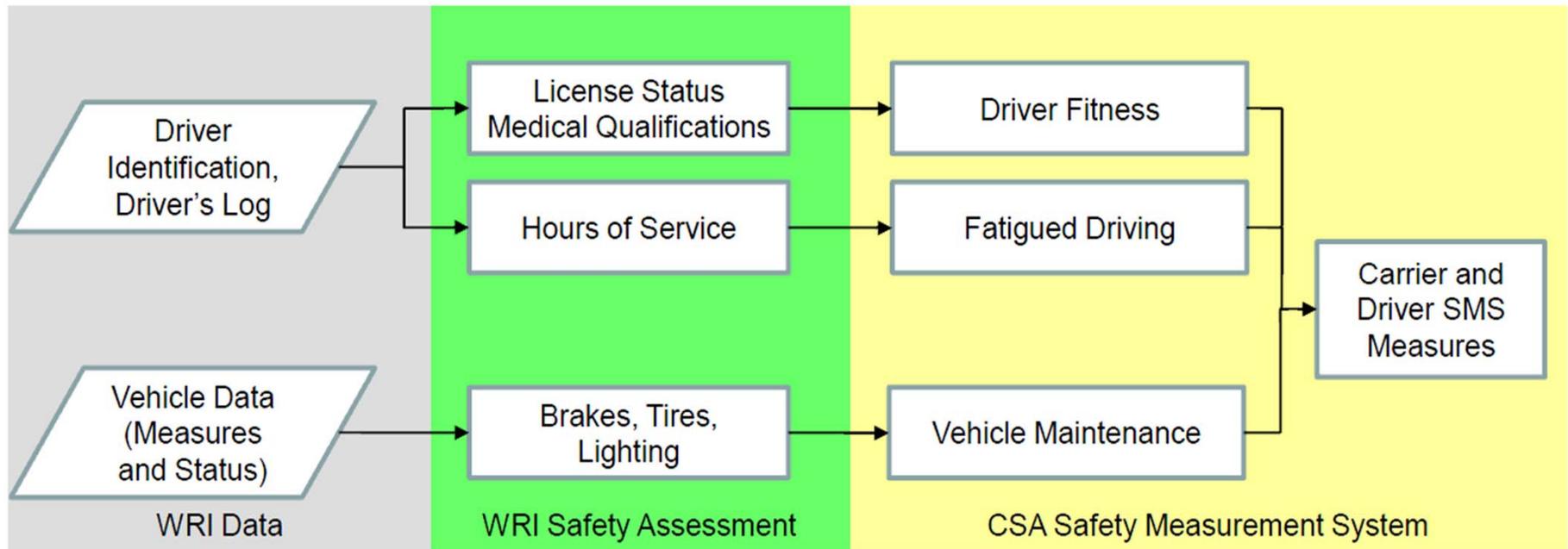
How can WRI support Compliance, Safety Accountability (CSA)?



Impacts to the Safety Management System

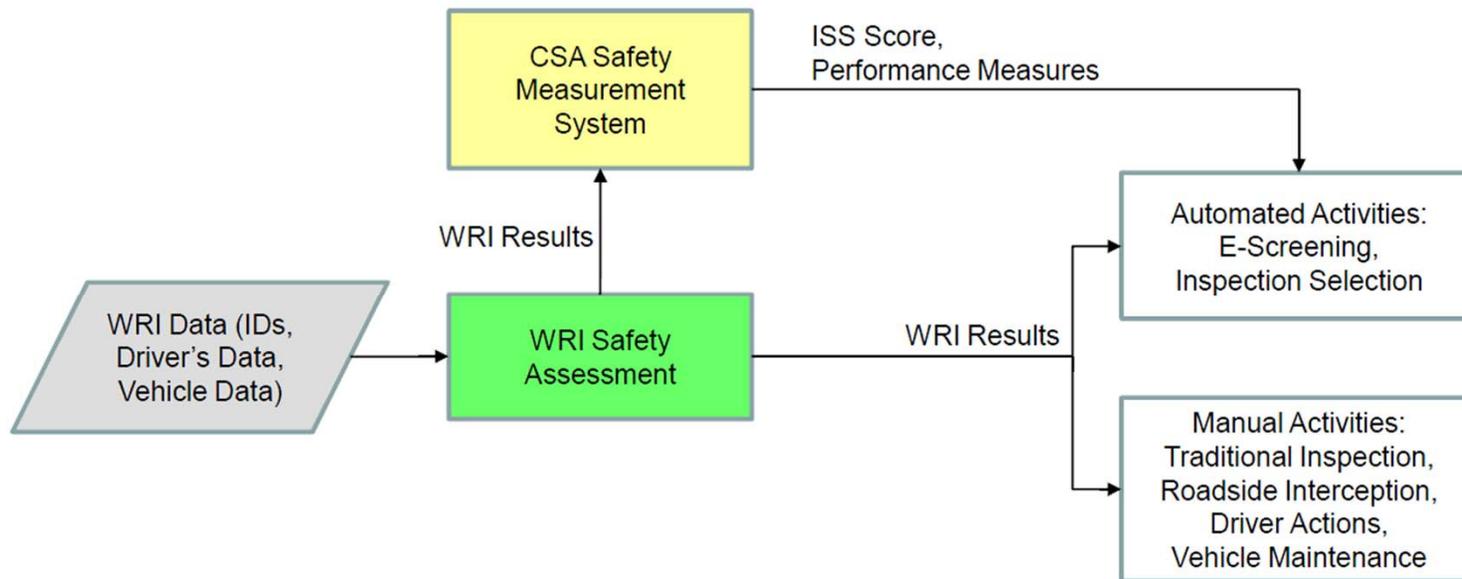
► Safety Measurement BASIC Scores

- Increase number of inspections (3.4 M to 85 M inspections annually)
 - Increase the number of carriers receiving scores through additional data collected
 - Increase the number of observations for each carrier creating more accurate scores
- Provides inputs to Fatigued Driving, Driver Fitness, and Vehicle Maintenance Behavioral Analysis and Safety Improvements (BASICS)

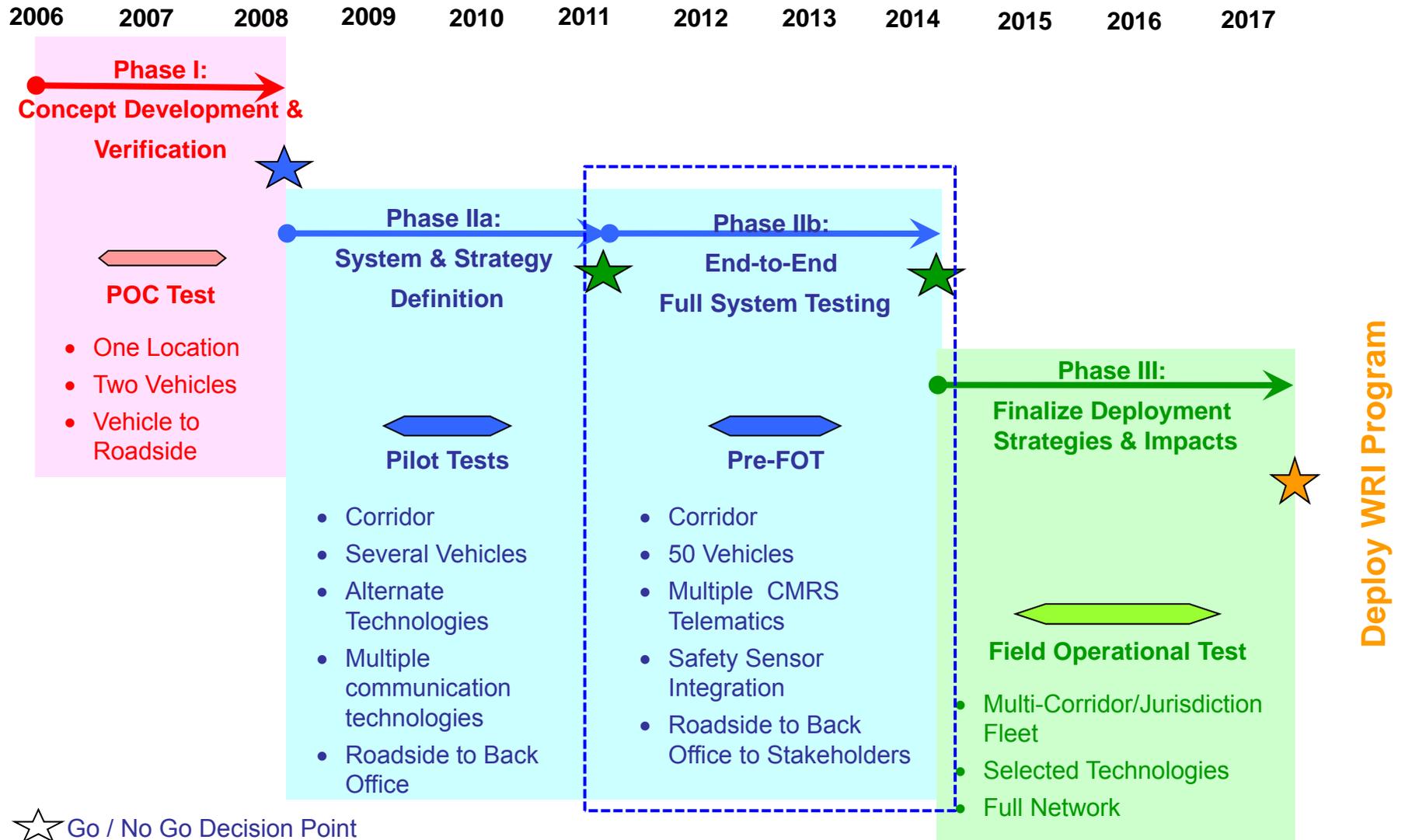


Expected Impacts to Roadside Inspection Process

- ▶ Increase effectiveness and efficiency of e-screening and inspection selection
- ▶ Seed the traditional inspection with WRI results
- ▶ Provide alerts to carriers and enforcement staff about drivers or vehicles operating with violations



WRI Program Phases & Schedule



WRI Pre-FOT Vision

“A CMRS-based solution that is developed based on a set of end-to-end and sub-module (“black box”) functional specifications. Assumptions are documented and explored as to validity. The final WRI Pre-FOT system is scalable in all of its components and interfaces to meet the needs of an FOT. WRI system features that are seen by stakeholders as needed for a truly viable system are included, developed, tested, and analyzed in the Pre-FOT. The Pre-FOT total system (partners, hardware, software, and vehicles) is small enough to be manageable, but large enough to give statistically meaningful data that will answer the go/no-go question for a full FOT.”

WRI Pre-FOT Goals and Objectives

► Goal

- To test and validate an end-to-end Wireless Roadside Inspection (WRI) system on multiple CMVs that can inform the FMCSA's plans to conduct a full WRI Field Operational Test (FOT).

► Objectives

- Using the current WRI Program Requirements, ConOps, and Architecture documents, develop a set of functional specifications for the components of a WRI Pre-FOT system.
- Facilitate the development of the WRI Pre-FOT system.
- Operate and collection data on the Pre-FOT system.
- Evaluate the Pre-FOT system.
- Measure government and industry benefits of a Wireless Roadside Inspection network.
- Report on the Pre-FOT and inform the FMCSA WRI FOT go/no-go decision.

WRI Pre-FOT Approach

- ▶ Leverage currently existing WRI Requirements, ConOps, Architecture, and Use Cases
- ▶ Partner with private industry to further develop hardware from the WRI Pilot Test and Federal Highway Administration's Fuel Tax Evasion effort
- ▶ Develop the end-to-end system based on a "black box model ". Each black box module will give desired outputs based on required inputs.
- ▶ Real Personally Identifiable Information (PII) will not be passed through the system. A database of fake information will be built to represent each carrier, vehicle, and drivers.
- ▶ Work outside the Federal Motor Carrier Safety Administration's (FMCSA) Information Technology (IT) security protocols (as much as possible, although we will implement the same encryption and other security protocols) to allow more functionality, adaptability, and flexibility. System will be designed in such a way as to allow it to be mapped over into a more regimented architecture after it is proven to work.

WRI Pre-FOT Approach - Continued

- ▶ Test sites, images, or snap shots of the relevant federal data bases (e.g. DIR, MCMIS, SAFER) will be created and used to form the WRI inspection record.
- ▶ Develop the Pre-FOT Government System (GS) (formally the Government Back Office System) in the private sector (with all developed source code to be a project deliverable, to allow the system to be directly mapped to a federal system).
- ▶ Establish the following oversight and guidance committees:
 - WRI Program Guidance Committee
 - Definitions and Oversight Committee
 - Representative Stakeholder Committee
- ▶ Operate 50 CMV from three fleets (motor coach, private, for hire) in a real-world environment for a one-year period.

WRI Pre-FOT System Overview

Federal Systems

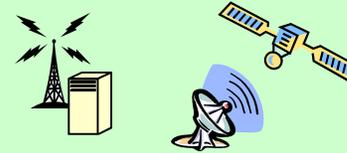
WRI
Government
System



Federal
CMV Safety
Systems

State Systems and Personnel

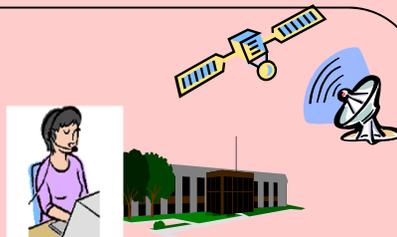
Roadside Law
Enforcement and
Compliance
Staff/Systems



- Traditional Screening/ Inspection Station
- Virtual Weigh Station

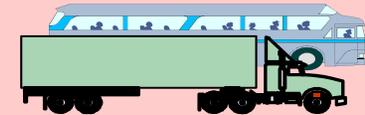
Private Systems and Personnel

Motor Carrier
and/or Telematics
Provider

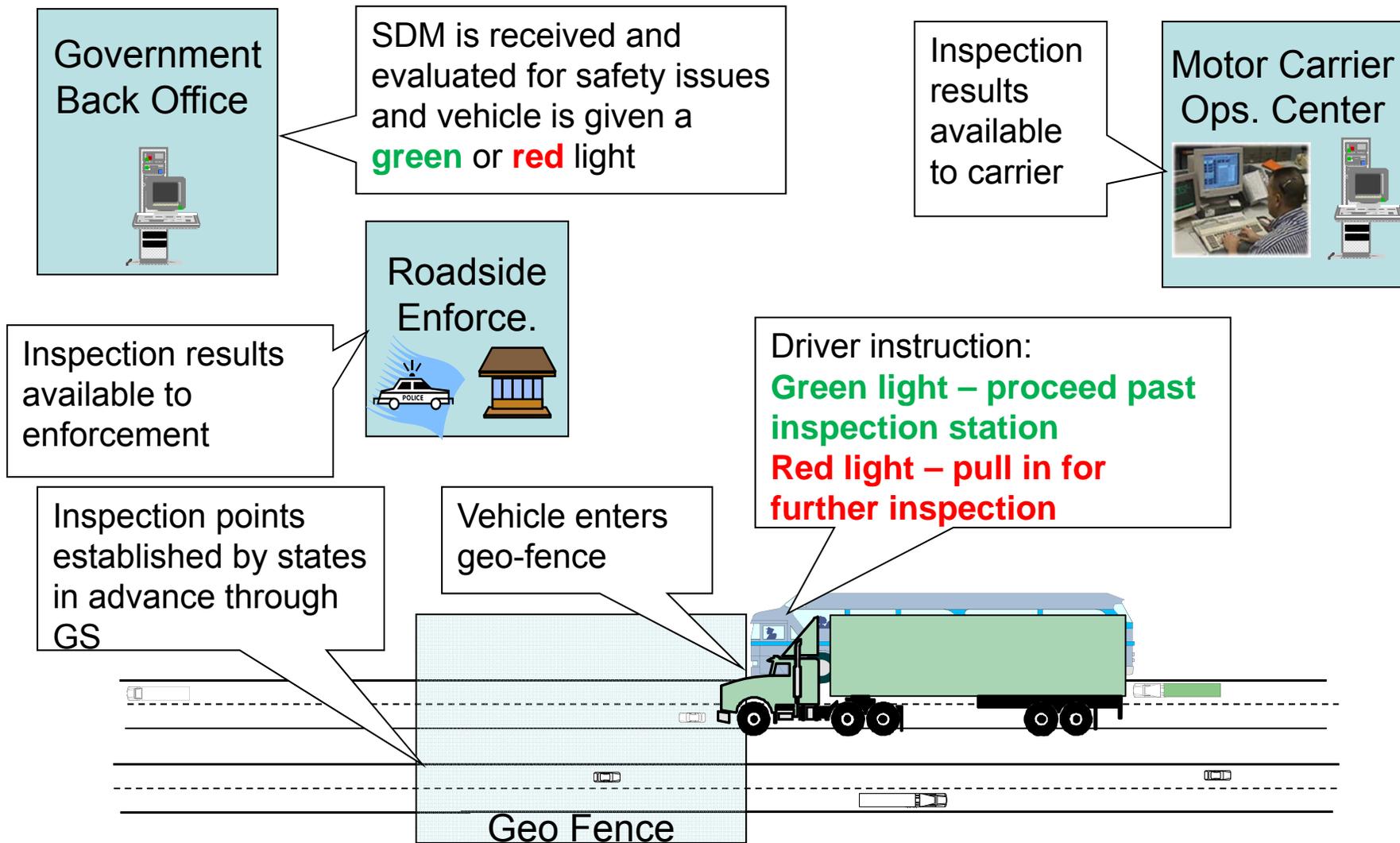


Commercial Motor Vehicle
With On-Board WRI
Equipment

- EOBR
- Standard Vehicle Databus Messages
- Other Safety Sensors



WRI Pre-FOT Concept (communication path neutral)



WRI Pre-FOT Modules

- ▶ For the purposes of the Pre-FOT, the following modules have been defined and will require a set of unique specifications –
 - WRI T2TCU – The hardware and software to collect, transfer, and place the safety sensor data onto the tractor's J-1939 data bus
 - Telematics device – The hardware and software to assemble and transmit the SDM
 - Government System – The hardware and software to receive the SDM, process the inspection results, transmit the inspection results to the stakeholders
 - Carrier Interface – the software to allow a carrier to interact with the information contained in the inspection results
 - Enforcement Interface – the software to allow state and federal enforcement personnel interact with the WRI system and its data/inspection results

WRI CMRS Roles

- ▶ FMCSA – Program sponsor
- ▶ ORNL – Pre-FOT lead, partnerships, testing, reporting
- ▶ Private Industry – Provide safety sensors, develop trailer-to-tractor communications unit (T2TCU), develop GS, develop telematics system, develop carrier user interface (CUI), develop enforcement user interface (EUI)
- ▶ **TBD** – Evaluation
- ▶ Committees – Oversight, guidance, feed WRI Program Requirements, Conops, Architecture, and Use Cases
- ▶ TDOS – Provide facilities and enforcement staff for Pre-FOT

WRI Pre-FOT Partnership Methods

- ▶ Motor Carriers via a Memorandum of Understanding - *A non-binding legal document that outlines the entry criteria, exit criteria, goals, roles, deliverables, and terms of participation for Partners involved in the WRI Pre-FOT*
- ▶ Telematic(s) via ORNL Contracting – Sole source or competitive bid based on progress shown in WRI Pilot Test.
- ▶ T2TCU via Sole source -Based on technology developed in the FHWA FTE effort.
- ▶ TDOS via CMVRTC – Ongoing support via MCSAP grant
- ▶ GS – via ORNL Contracting

WRI Pre-FOT Partners

- ▶ Motor Carriers –
 - Motor Coach; TBD
 - For Hire; TBD
 - Private; TBD

- ▶ Telematics -
 - 1 - TBD
 - 2 - TBD
 - 3 – TBD

- ▶ Safety Sensor and T2TCU - TBD

- ▶ GS – TBD

WRI Pre-FOT Committees

WRI Program Guidance Committee - responsible for the overall direction for the WRI program

- Participants: Representatives from government, industry, and academia with relevant experience
- Key Roles
 - Prior to Development - development of the “black box” definitions and functional specifications
 - During and after Development – kept aware of Pre-FOT activities and be made aware of test results to inform the future direction of the WRI program, revising the architecture, ConOps, and other guiding documents accordingly.

WRI Pre-FOT Committees

Definitions and Oversight Committee – Guide the development of the Pre-FOT GS.

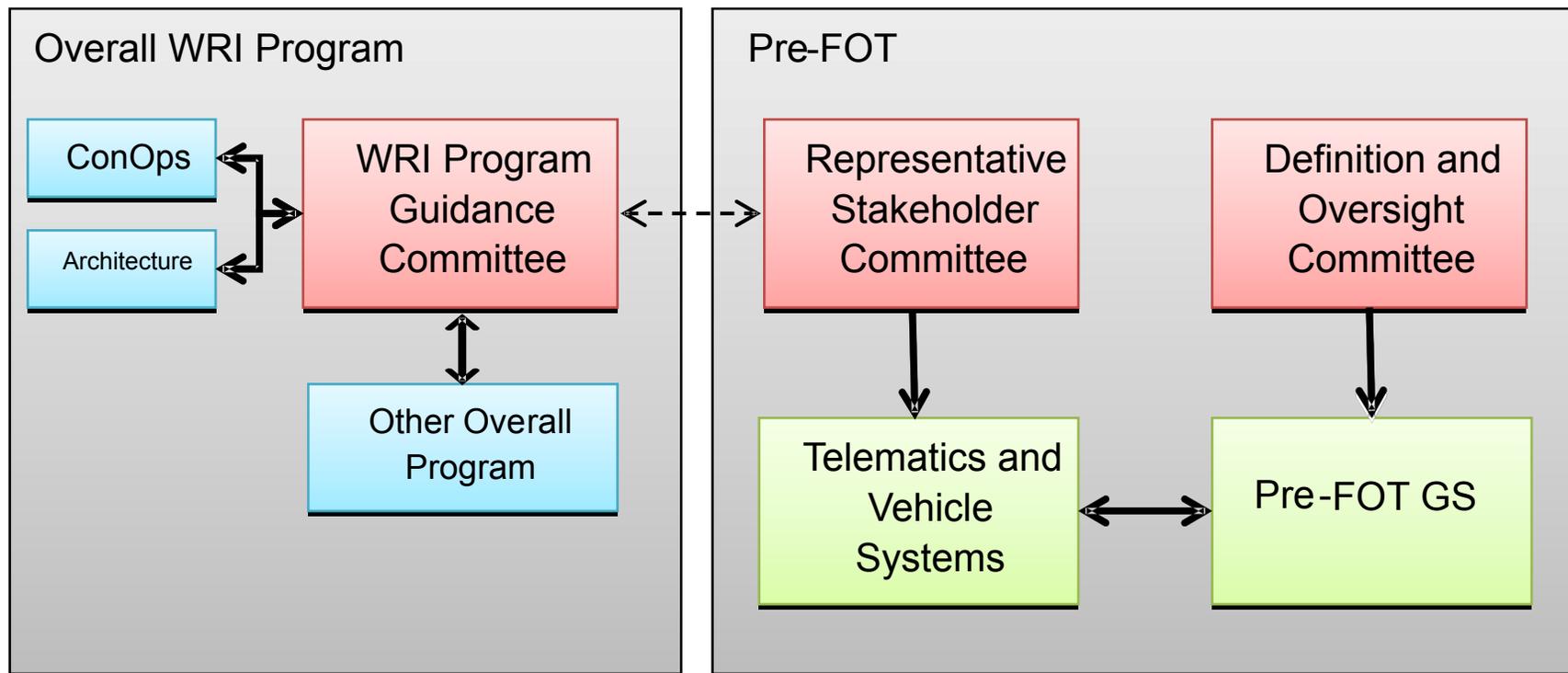
- Participants: Representatives with relevant experience from government/academia (development of large networks and data base systems), industry (fleets, telematics, and sensor), and enforcement (state, federal CMV and state IT/IS)
- Key Roles
 - Prior to Development – provide input to Program Guidance Committee assisting the development of the “black box” definitions and functional specifications
 - During Development – ask the right questions, guide the process, eliminate assumptions, recognize errant planning and systematic weaknesses, and provide broad insight from stakeholders to mitigate short-falls in system capability; assist in design of test scenarios to characterize the final system
 - During Pre-FOT – support and monitor testing
 - Following Testing – provide recommendations to WRI Program Guidance Committee as a result of the testing and evaluation

WRI Pre-FOT Committees

Representative Stakeholder Committee - to provide guidance of the Pre-FOT testing and implementation.

- Participants: Partners in the Pre-FOT, augmented with additional enforcement and/or fleet personnel as needed.
- Key Roles
 - Prior to Development – provide input to Program Guidance Committee assisting the development of the “black box” definitions and functional specifications
 - During Development and Testing – generating project change orders as needed to adapt to the test circumstances which meet the budget, timeline, and scalability constraints while adhering to the Pre-FOT specifications
 - Following Testing – provide recommendations to WRI Program Guidance Committee as a result of the testing and evaluation

Relationship of WRI Pre-FOT Committees



WRI Pre-FOT System Features

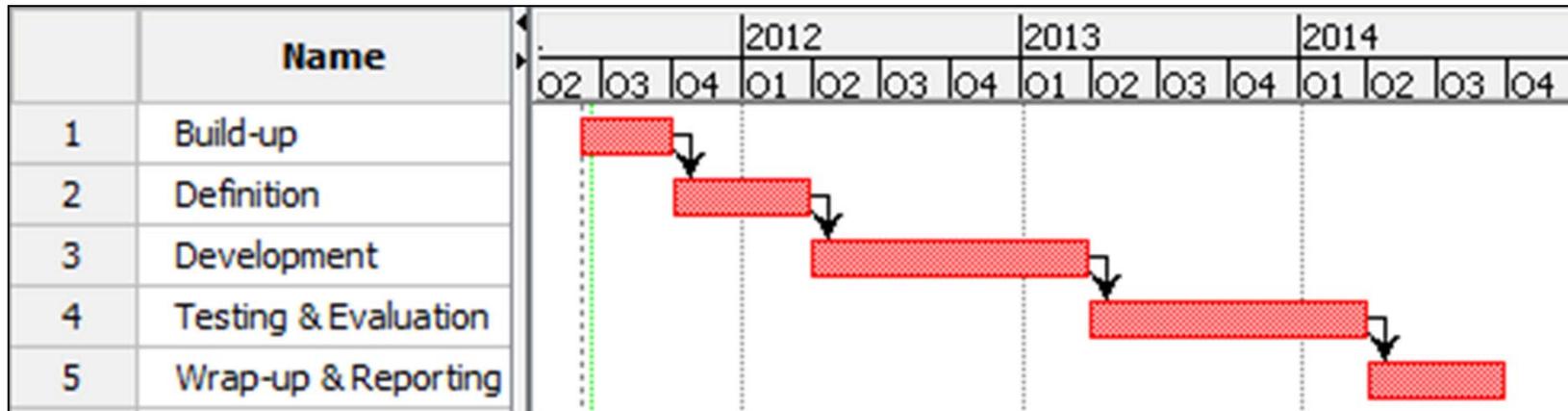
- ▶ Alerts-based enforcement interface
 - ▶ Customized carrier interface provided by carrier's telematics provider
 - ▶ Pull-in/by-pass feature for real-time interdiction
 - ▶ Self-test feature for driver
 - ▶ HOS calculations handled by telematics provider; driver data portability
 - ▶ Pre-programmed inspection sites; updated quarterly; turn-on/turn-off feature; selectable pull-in rate
- 
- ▶ Addresses issues and concerns encountered in the Pilot Tests

WRI Pre-FOT Work Tasks

- ▶ Program Management
- ▶ Draft Team SOWs
- ▶ Establish Committees
- ▶ Develop System Component Functional Specs
- ▶ Establish Partnerships
- ▶ Develop Pre-FOT System
- ▶ Conduct FOT
- ▶ Analyze Data
- ▶ Evaluate
- ▶ Report



WRI Pre-FOT Timeline



Note that the years here are CY, not FY

Thank you!
For Questions or Comments, Please Contact:

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