



# Wireless Roadside Inspection Research Program Field Operational Test Overview

Comprehensive Stakeholder Group Webinar

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March 20, 2014





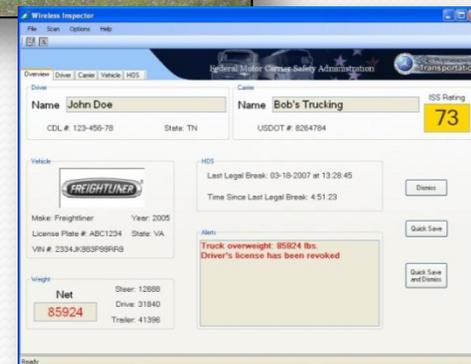
# WRI Characteristics

- Assessment of driver, carrier and vehicle compliance via secure wireless communications while the commercial motor vehicle (CMV) passes by fixed and portable sites.
  - System uses identifier information to query federal and state databases to identify potential OOS violations.
  - System assesses driver hours of service (HOS) information.
  - Envisioned to augment data available to the Safety Measurement System (SMS).
  - Field operational test is using Commercial Mobile Radio Services (CMRS) for communications.



# WRI Background – Phase 1

- Proof of Concept Test (POC) – Testing of commercial off-the-shelf (COTS) or near-COTS technology to validate the wireless inspection concept (completed August 2007). The POC consisted of:
  - One location
  - Two vehicles
  - Vehicle-to-roadside communications





# WRI Background – Phase 2

- Pilot Test – Safety and inspection technology maturation demonstration, system loading, and back office system integration (completed November 2011). The Pilot Test included:
  - Several vehicles
  - Alternative technology
  - Multiple communication paths
  - Vehicle-to-back office, back office-to-roadside communications





# WRI Background – Phase 3

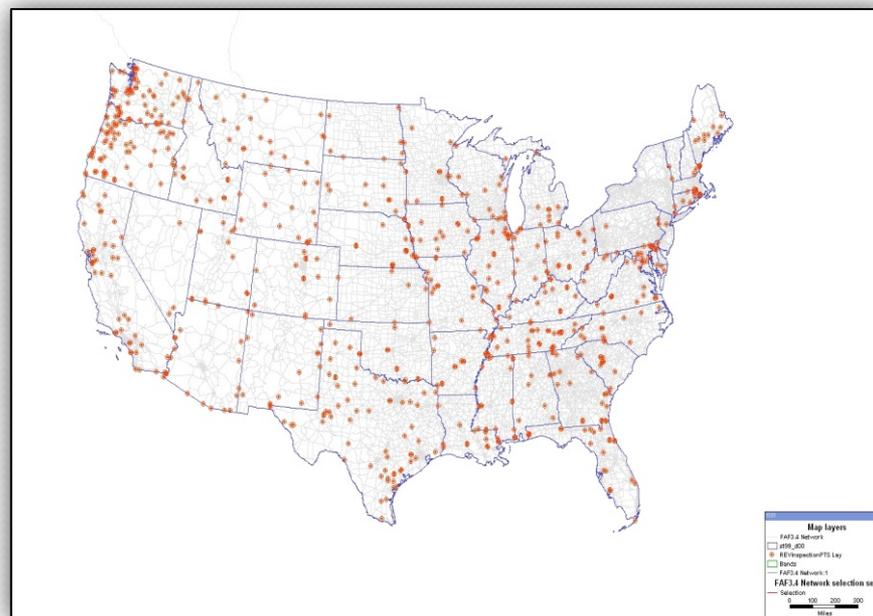
- Field Operational Test (FOT) – Full end-to-end system testing on multiple vehicles from multiple fleets within a multi-state corridor (began July 2012). To include:
  - Fully-integrated network: vehicle/roadside/wireless inspection processing system (WIPS)
  - Determine the viability and effectiveness of wireless CMV inspection using existing CMRS technologies
  - The system would receive and process the safety data messages in real time to a system for future deployment via the Commercial Vehicle Information Systems and Networks (CVISN) Program or other funding source.
  - Partnered with the Department of Energy's Oak Ridge National Laboratory (ORNL) to conduct the research



# WRI FOT Year-1 Activities

- Potential Loading Calculations (CONUS)

- Per Hour – 117,765
- Per Day – 2,862,352
- Per Year – 1,031,618,421



Permanent inspection stations and FAF Database (Continental US)





# WRI Phase 3 – Field Operational Test (FOT)

- Maximum of 1,000 vehicles
- Multiple fleets
- Testing in Commercial Motor Vehicle Roadside Technology Consortium (CMVRTC) (Georgia, Kentucky, Mississippi, North Carolina, and Tennessee)
  - 20 inspection sites identified for data collection
- Selection of CMRS vendor to support testing through secondary procurement
- Development of WIPS



# WRI Objectives

- Demonstrate the following:
  - Transfer of a CMRS-generated Safety Data Message (SDM) to the WIPS
  - Transfer of the CMRS-generated SDM from the WIPS to the State centralized and roadside-based systems
  - WRI CMRS end-to-end system functionality
  - Carrier, enforcement, and compliance decision making using associated WRI graphical user interfaces (GUI) populated with the CMRS-generated SDM/Inspection Record
  - WRI system can handle load of a nationally deployed system



# WRI FOT Approach

- Approach Key Elements
  - 10 Strategic Go/No-Go decision points
  - Leverage prior work
  - Rely heavily on partnership with private industry
  - Create performance based requirements
  - Integrate DOT/FMCSA IT security requirements
  - Form oversight and guidance committees
  - Utilize the Commercial Motor Vehicle Roadside Technology Consortium as a test bed



# WRI FOT Work Steps

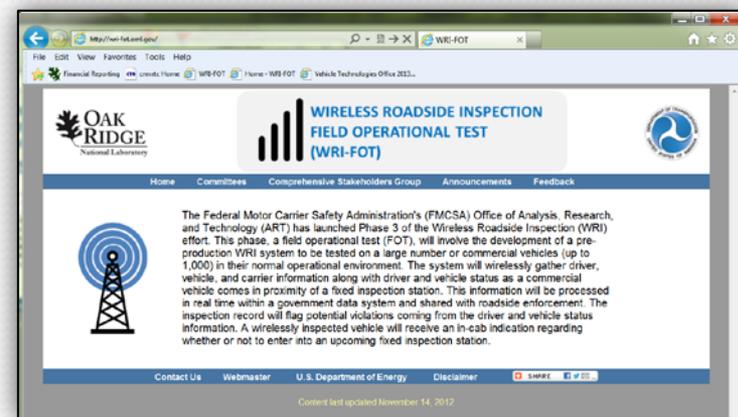
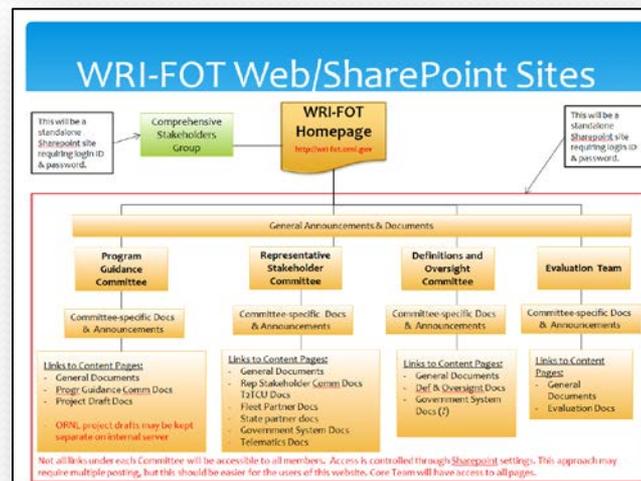
- Establish Committees (Program Guidance, WIPS Definition and Oversight, Representative Stakeholder)
- Develop Specifications (CMRS, WIPS)
- Partnerships and Procurement
- Develop Systems
- Conduct Testing
- Evaluate System
- Update Pre-Existing Documentation (Concept of Operations, Requirements, Architecture)
- Report Findings



# WRI FOT Year-1 Activities

- WRI SharePoint site developed for technical team and supporting committees
- WRI website developed for supporting committees and the Comprehensive Stakeholder Group

<http://wri-fot.ornl.gov>





# WRI FOT Year 1 Activities

- *WRI Program Guidance Committee*
  - This committee provides oversight for the overall direction of the WRI program.
- *Definition and Oversight Committee*
  - This committee provides feedback for guiding the development of the FOT Wireless Inspection Processing System (WIPS).
- *Representative Stakeholder Committee*
  - This committee will provide input on the implementation of the FOT system and to the FOT testing.
- *Comprehensive Stakeholder Group*
  - This committee provides an opportunity for stakeholders not actively participating in the FOT to stay informed of plans and progress. It also provides a mechanism for group members to comment on the FOT via the FMCSA facilitator.



# WRI FOT Year 1 Activities

- Partnerships with State Agencies



Georgia Motor Carrier Compliance Division



Kentucky State Police



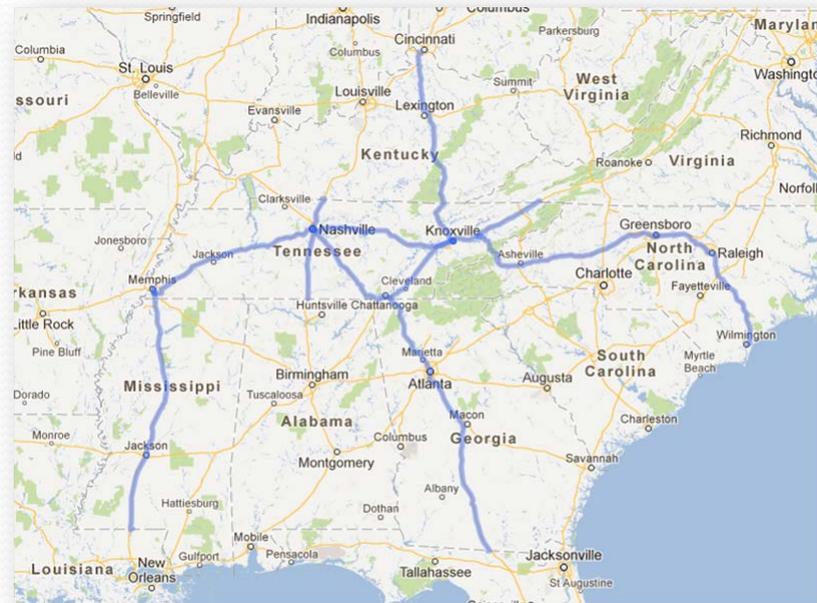
Mississippi Department of Transportation



North Carolina Highway Patrol



Tennessee Highway Patrol



Over 2,400 miles of interstate roadway



# WRI FOT – Year 1 Activities

- Functional specifications drafted
  - WIPS
  - CMRS
- Use cases developed
- Scenarios/Walkthroughs developed
- Safety data message set defined
- Support systems and databases determined
- Inspection record defined
- Triggering methodology defined
- Data uses defined



# WRI FOT – Year 2

- Conduct CMRS Request for Information (RFI) to gauge viability of CMRS functional specification and FOT approach
- Release WIPS and CMRS solicitations and award contract based upon acceptable technical and cost proposals to CMRS Provider
- Develop WIPS for processing of SDM and generation of inspection record
- Develop CMRS system to gather and transmit SDM and inform driver



# WRI – CMRS Provider Major Functions for FOT

- Registration with WIPS (includes testing ability of CMRS provider to successfully communicate and interchange WRI information with WIPS)
- Distribution of up-to-date trigger points to participating vehicles
- Identification of trigger points on the road upstream of any active WRI Site
- Manual triggering mechanisms
- Automatic triggering mechanisms
- Real-time assembly of the SDM
- Submission of SDM to the WIPS within a given time frame (to be tested and optimized during FOT)
- Submission of results to the inspected vehicle within a given time frame (to be tested and optimized during FOT)



# WRI –Trigger Zones: Maintenance and Distribution

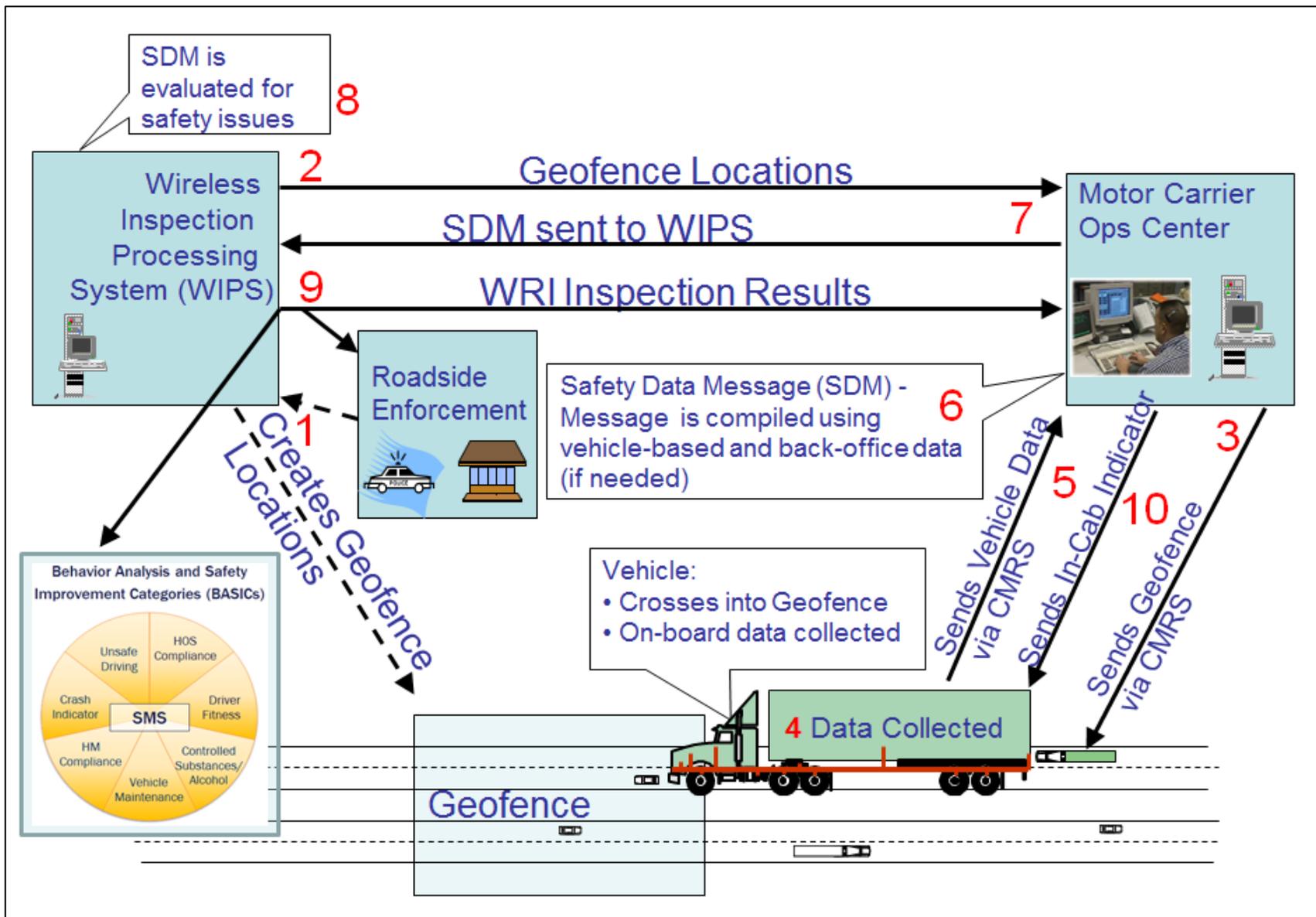
- Trigger points created and maintained by each participating State
  - Geo-location of WRI sites (e.g., permanent inspection stations, temporary inspections stations, etc.)
  - Time period—i.e., start date and end date—during which these WRI sites will be active (Note: micromanagement of each site can be accomplished locally by law enforcement)
  - Database of WRI sites updated daily with at least a 26-hour grace period before these sites become operational
- WRI trigger point distribution
  - Database of WRI sites accessible through WIPS by CMRS provider
  - Database of WRI sites distributed to participating vehicles no later than 26 hours after database release



# WRI – Partnerships and Procurement

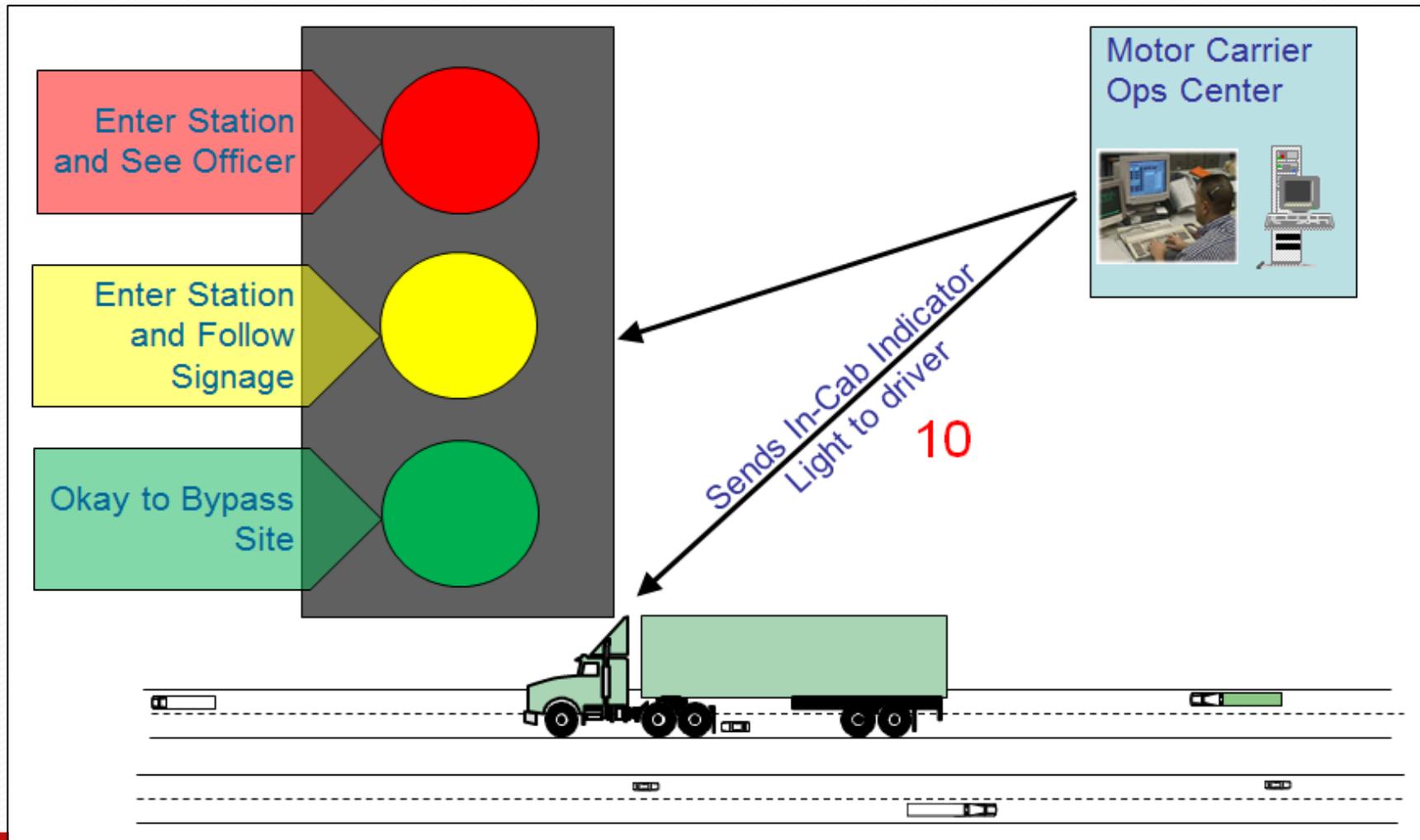
- The Upper Great Plains Transportation Institute will provide the development support for the WIPS via a contract from ORNL.
- A contracting process is underway to award a CMRS provider for the carrier-based part of the WRI FOT system. This contract will be for up to 1,000 test vehicles and associated technology.
- Fleet partners will be provided by via the CMRS provider.
- Law enforcement partnerships for WRI test corroboration will be provided via the CMVRTC.

# WRI Communication Path





# WRI – How the FOT Will Work for the Driver



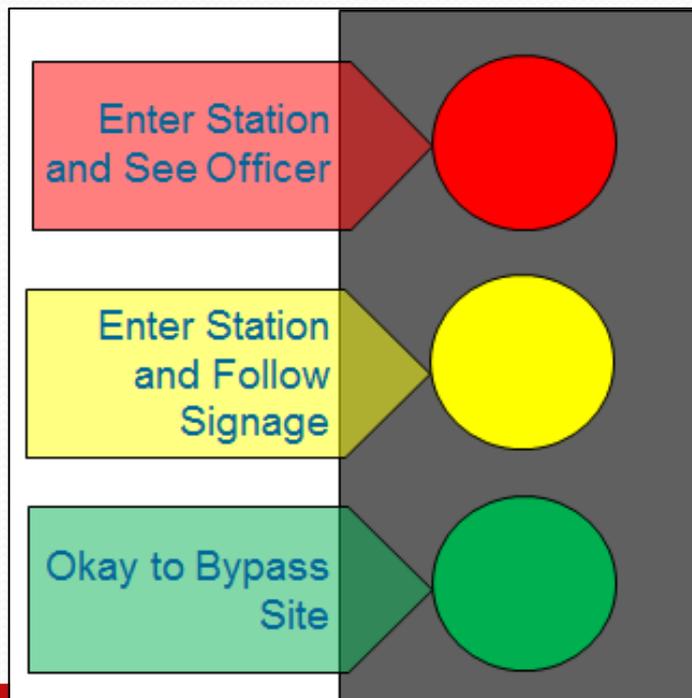


# WRI Operational Refinements

- In-Cab Indicators

- Exact mechanism (light, tone, etc.) has not yet been defined. Defer to CMRS industry for implementation.
- For the purposes of this presentation, we will use lights.

- They are:

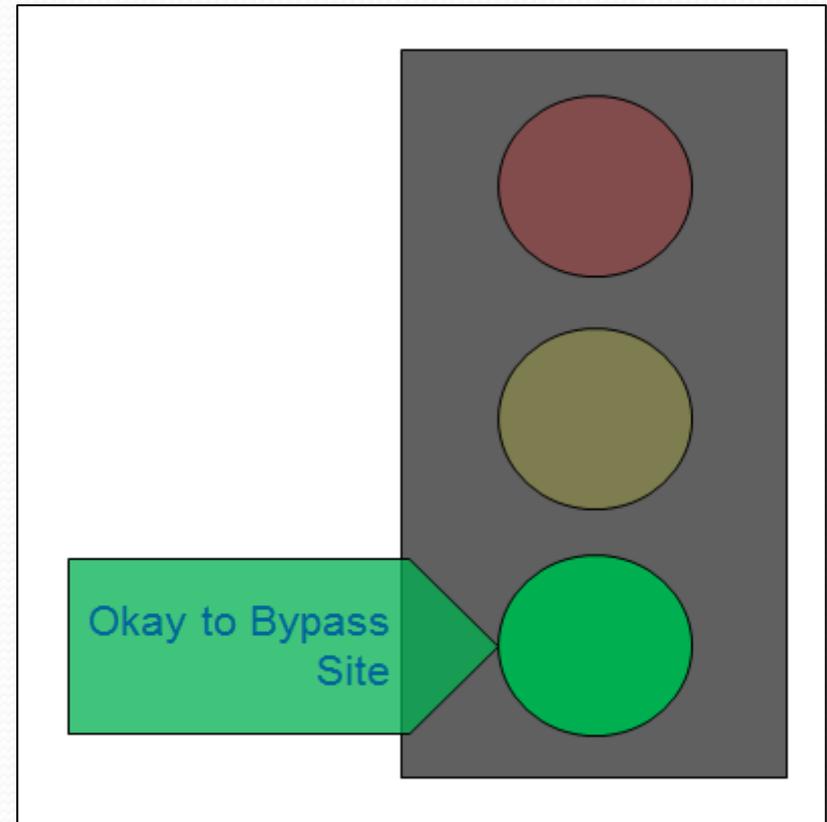




# WRI Operational Refinements

## In-cab Indicator – “Green”

- Indicates no problem is perceived based on available information.
  - Geotriggered Inspection – Okay for vehicle/driver to bypass inspection station.
  - Self-Test – Okay for driver to proceed based on available information.
  - Login – Okay for driver to proceed based on available information.
  - Officer Initiated Inspection – No problems identified during WRI inspection.

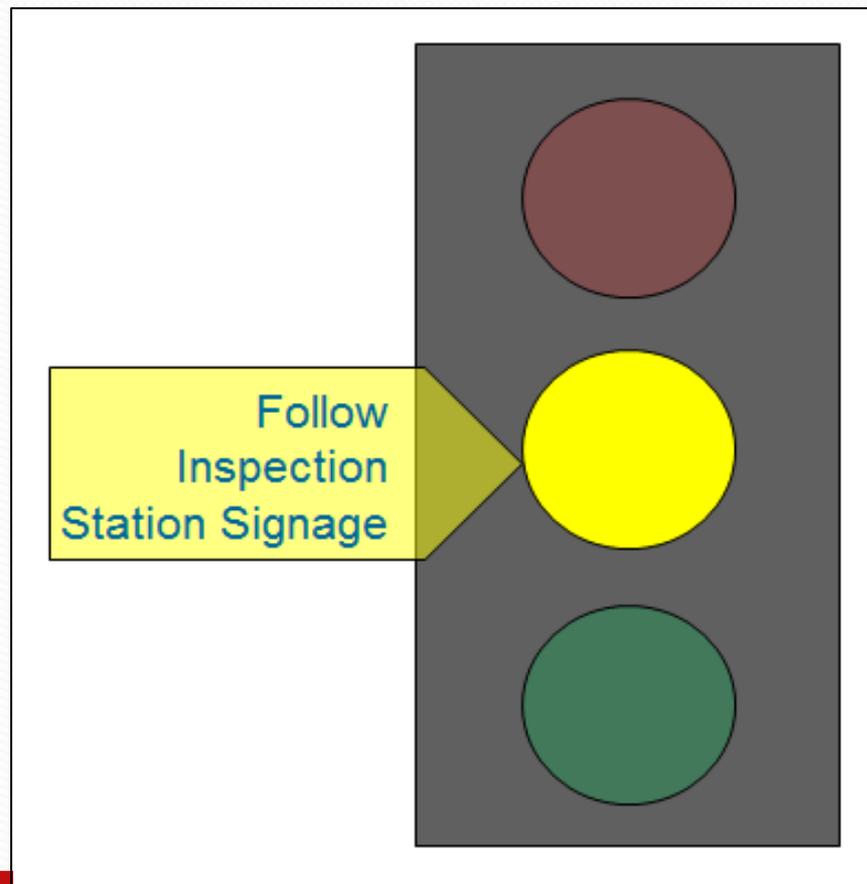




# WRI Operational Refinements

## In-cab Indicator – “Yellow”

- Typically indicates the vehicle has been selected for pull-in.
- Could indicate that there is a problem on the government side preventing analysis of data.
- Driver should follow inspection station signage.

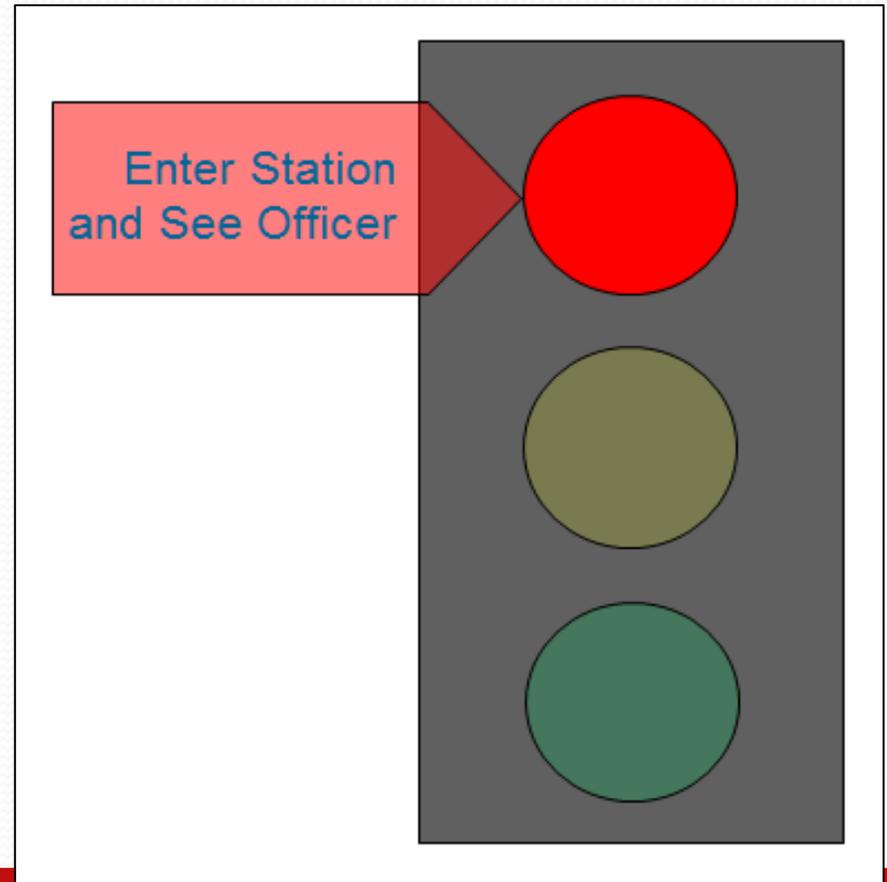




# WRI Operational Refinements

## In-cab Indicator – “Red”

- Indicates there is a perceived problem based on available information.
  - Geotriggered Inspection – Enter inspection station and see officer.
  - Self-Test – Driver may investigate problem and correct if possible.
  - Login – Driver may investigate problem and correct if possible.
  - Officer Initiated Inspection – Enforcement officer will follow up with driver/carrier.

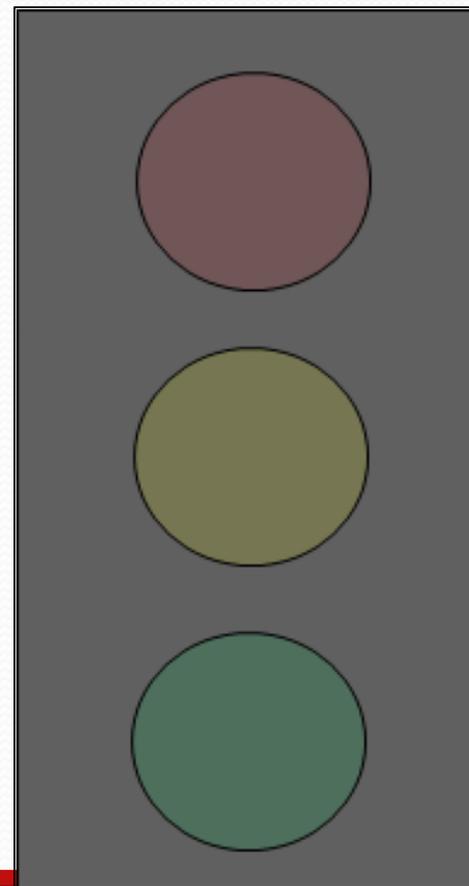




# WRI Operational Refinements

## In-cab Indicator – “No Light”

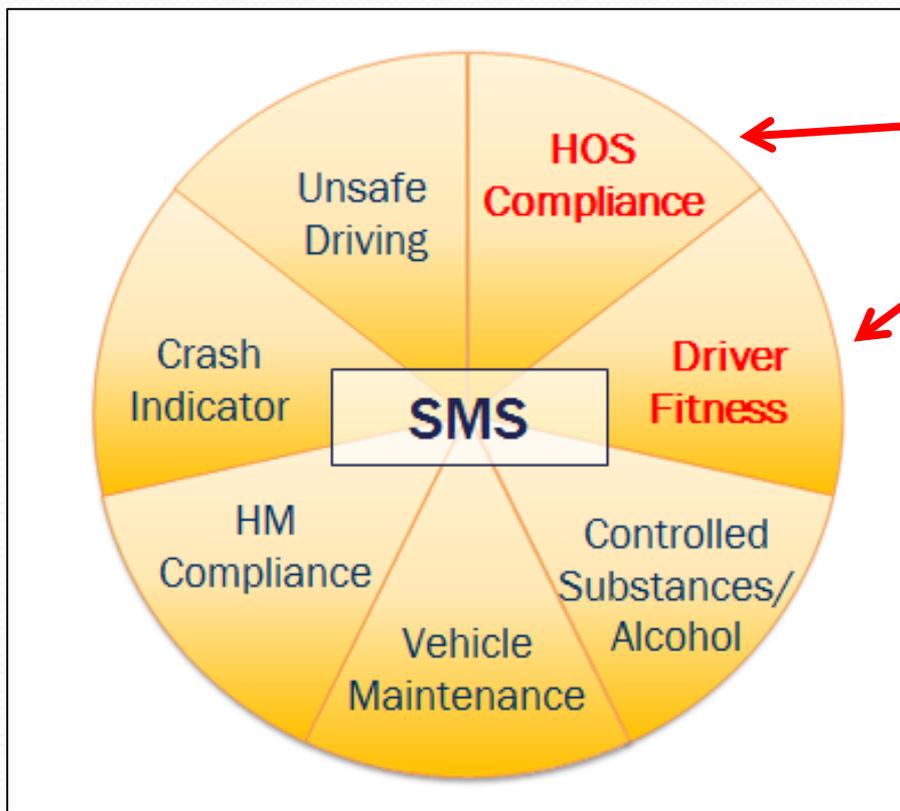
- Could indicate carrier’s WRI account not active.
- Could indicate there is a problem on the telematics/carrier side preventing the wireless inspection.
  - Driver should follow existing signage.
  - Data received by the government system will be retained for reporting.
  - “No light” situation is expected to be a very low occurrence.





# WRI – Potential Benefits – CSA

## Behavior Analysis and Safety Improvement Categories (BASICS)



Data acquired can have a potential effect on these segments





# Question/Comment Submissions

Please provide any questions or comments on the WRI Program to the Comprehensive Stakeholders

Group SharePoint site:

<http://wri-fot.ornl.gov>