



# FHWA Maintenance Operations Update

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FHWA Office of Operations

July 20, 2016

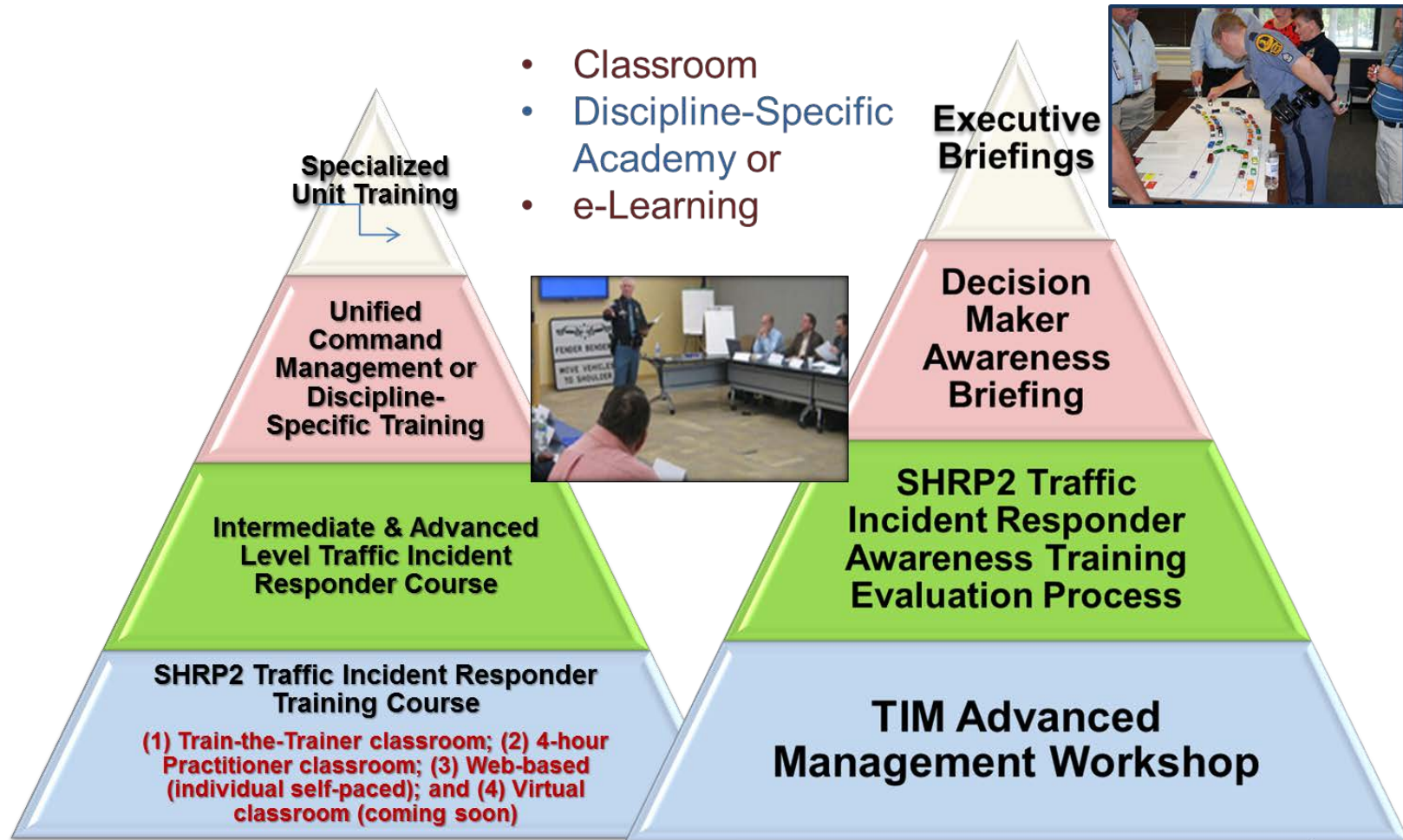




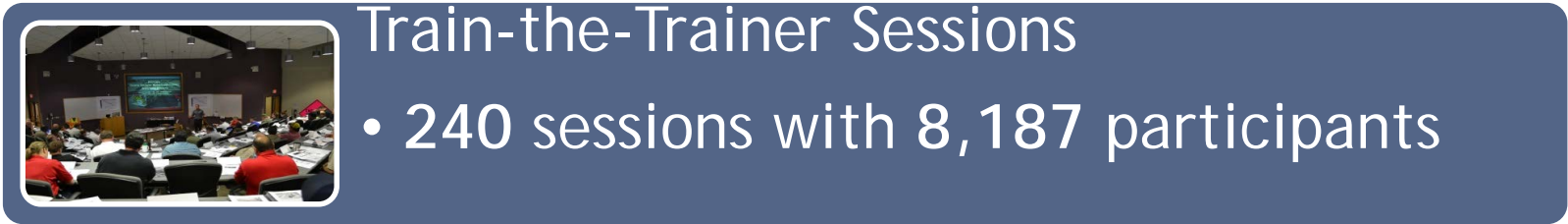
# Traffic Incident Management (TIM) Training Programs



# Training for TIM Responders and Program Managers



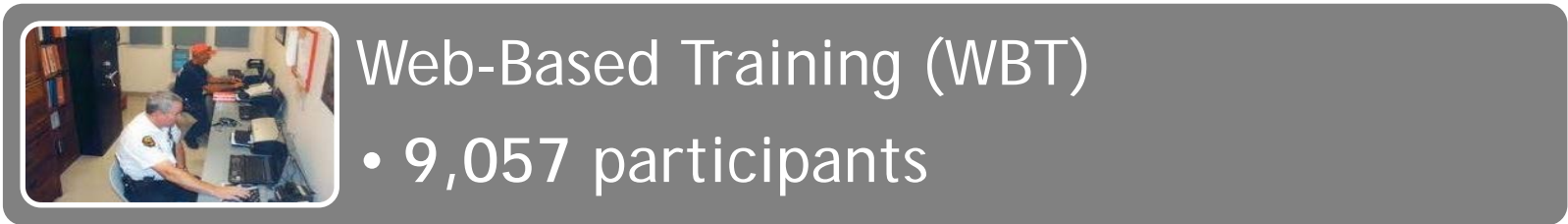
## A vertical collage of six images. From top to bottom: a bright lightning bolt striking down; a large orange construction truck; a light blue semi-truck; a white sign with black text that reads 'ROAD CLOSED' above a red and white striped barrier; a close-up of a wind turbine's blade; and a weather icon showing a sun behind a cloud with rain and snowflakes.



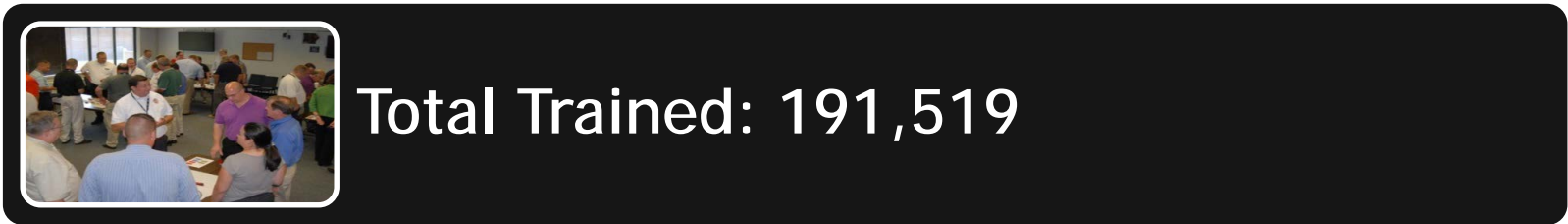
- 240 sessions with 8,187 participants



- 7,226 sessions with 174,275 participants



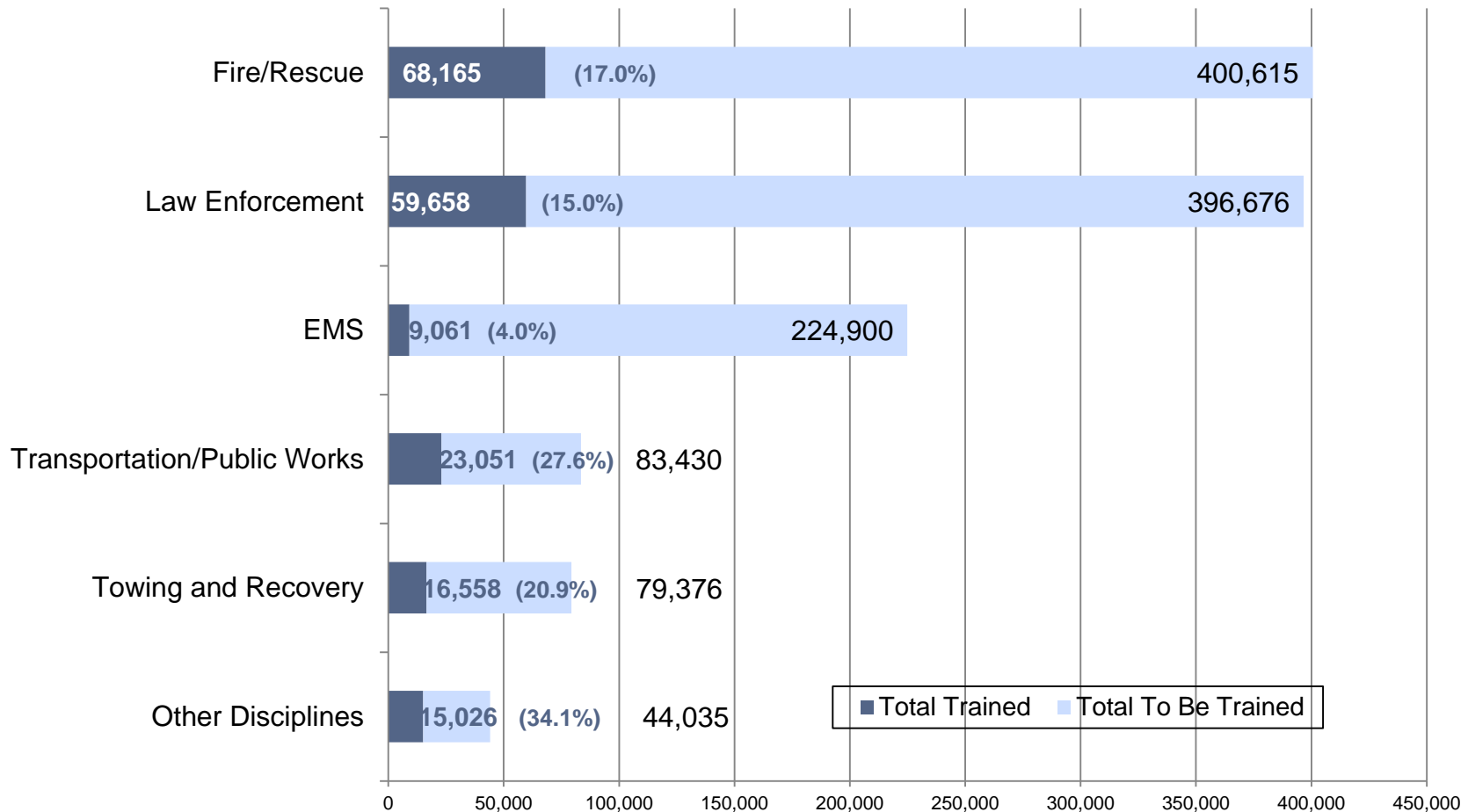
- 9,057 participants



# Total Trained: 191,519



# Total Trained by Discipline

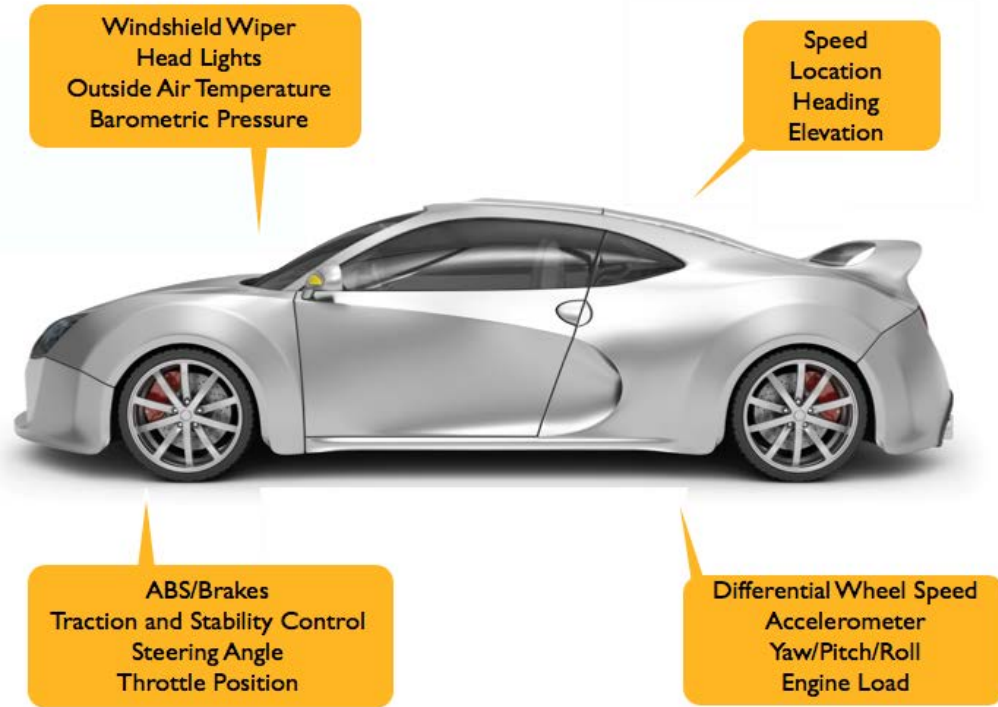




# Road Weather Connected Vehicle Applications



# Connected Vehicles

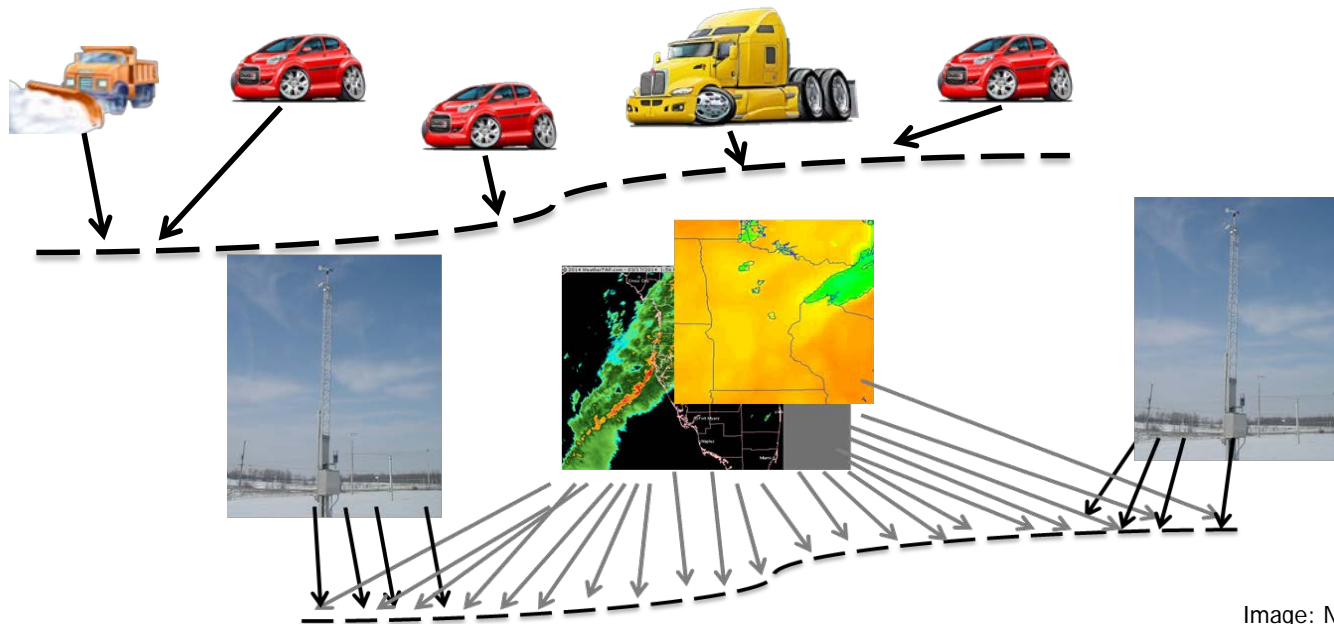


Images: USDOT, NCAR

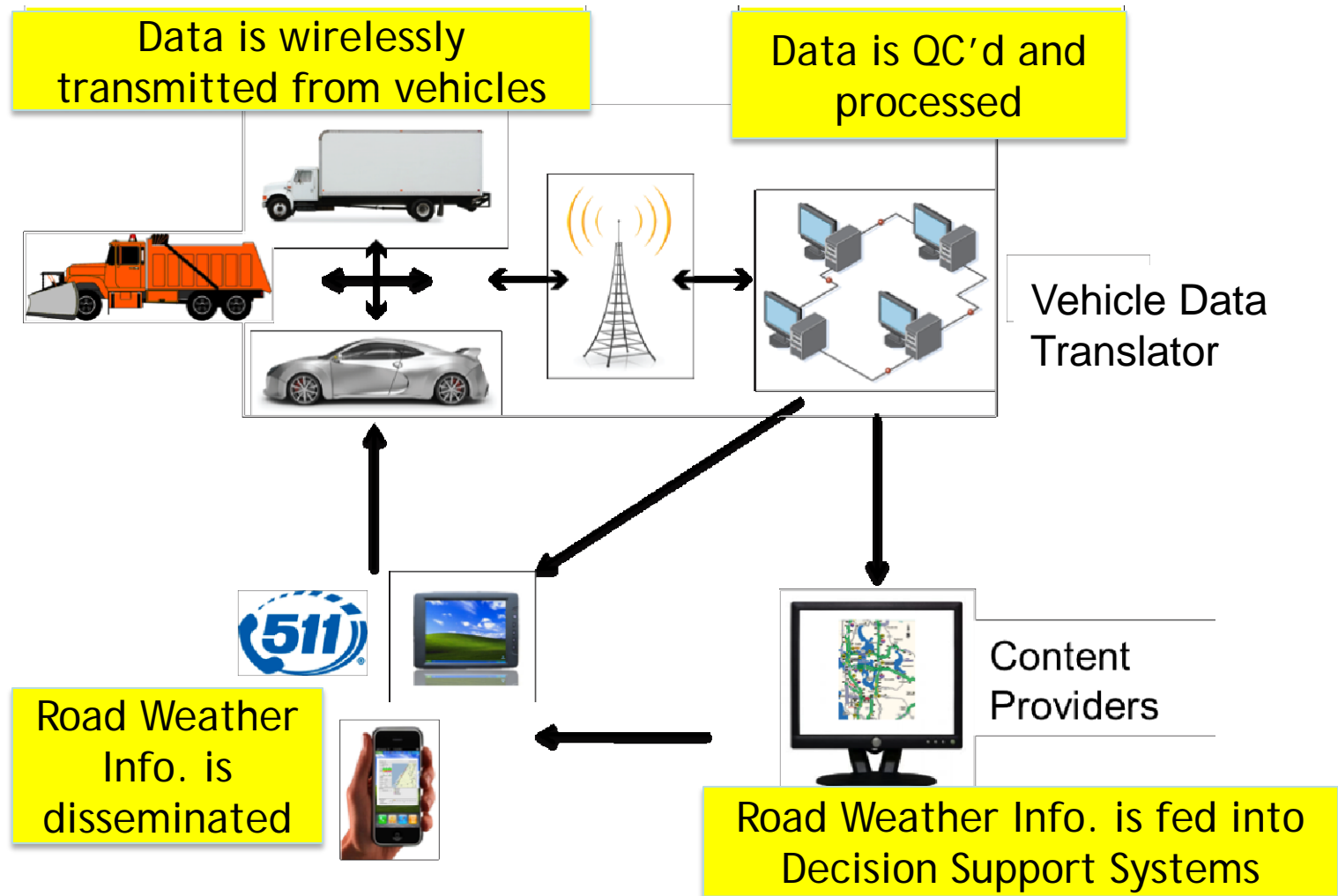


# Connected Vehicle Data Translator (Pikalert® VDT)

- Software that creates highly detailed weather and road condition nowcasts and forecasts
- Inputs:
  - Vehicle-based measurements (vehicle actions, pavement conditions, atmospheric measurements)
  - Traditional weather data sources



# Using Pikalert VDT



# The Weather Data Environment (WDE)

<https://wxde.fhwa.dot.gov>

- The WDE is a database system that collects, quality checks, archives, and disseminates road weather observations
- The purpose of WDE is to provide a data and interoperability platform to meet the weather-related research needs of the community, especially for ITS

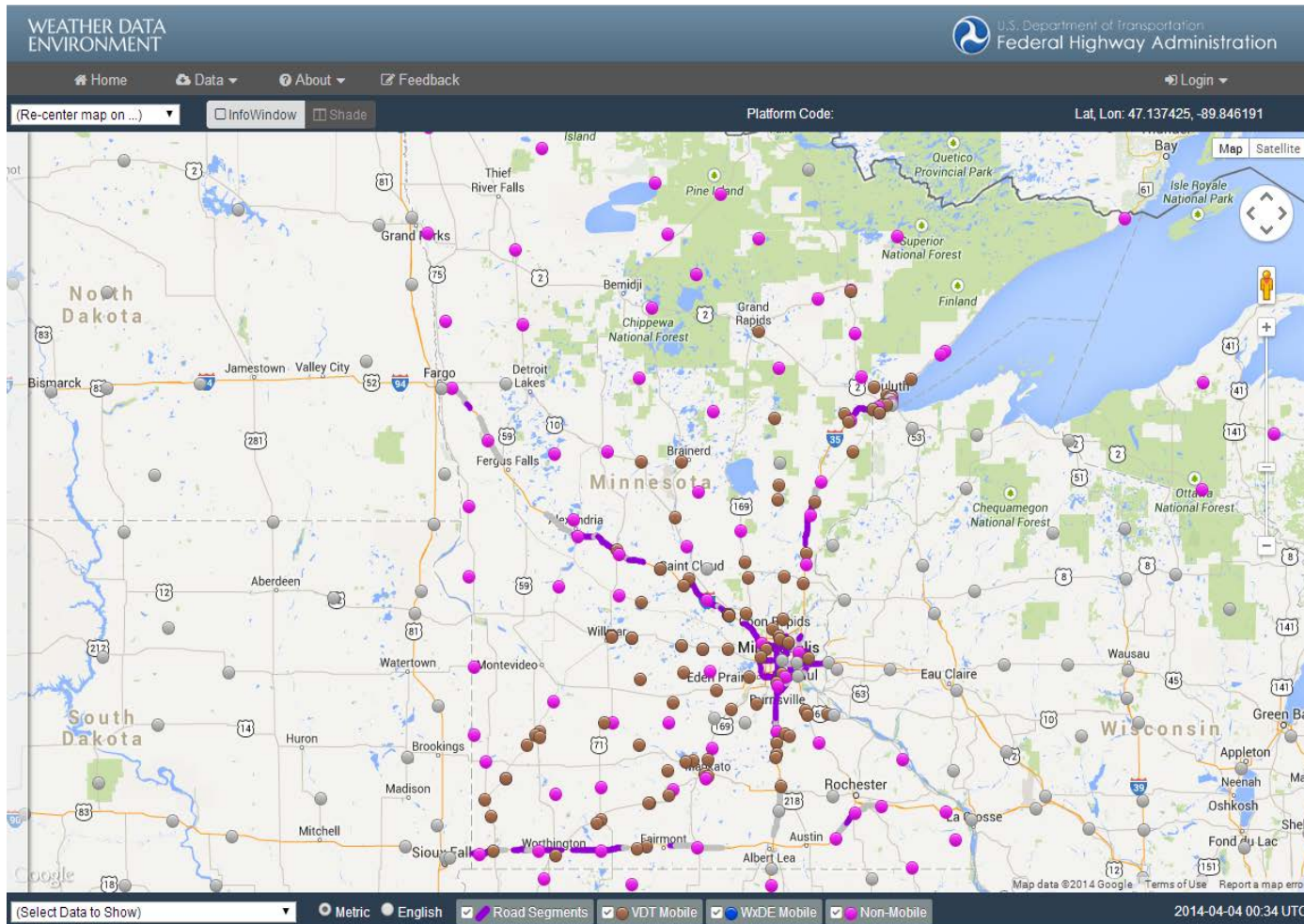


# WDE Functions

- Collection of Data
  - Road Weather Information Systems (RWIS)
  - Mobile Vehicles
  - Weather observations from the National Weather Service (NWS) - used for quality checking
  - Metadata about the contributors, sites, stations, sensors, observations, quality checks, and more
- Quality Checking of Observations (using Pikalert)
- Dissemination of Data
  - Map Graphical User Interface (GUI)
  - On-Demand Query
  - Subscription Service



# WDE User Interface



# Integrated Mobile Observations (IMO) Project


## Objectives:

- Better understand how to capture, communicate, and process data from the vehicle's internal codes and external road weather sensors placed on the vehicle
- Identify uses for and incorporation of the data in new and established applications
- Evaluate the impacts and results of utilizing the data in applications

## Outcomes:

- Used to enhance decision making by traffic operators, maintenance managers, and travelers





# Integrated Mobile Observations (IMO) Project

Explore the feasibility of using vehicle-based data to improve transportation safety & mobility

## Minnesota DOT

- ~550 Vehicles
- Data
  - Air Temperature
  - Relative Humidity
  - Surface Temperature
  - Wiper Status
  - Brake Status
- AVL & Cellular

## Michigan DOT

- ~50 Vehicles
- Data
  - Air Temperature
  - Relative Humidity
  - Surface Temperature
  - Brake Status
  - Accelerometer
- Bluetooth & Cellular

## Nevada DOT

- ~20 Vehicles
- Data
  - Air Temperature
  - Relative Humidity
  - Surface Temperature
  - Wiper Status
  - Maintenance Status
- Radio & Cellular



# Enhanced Maintenance Decision Support System (EMDSS)

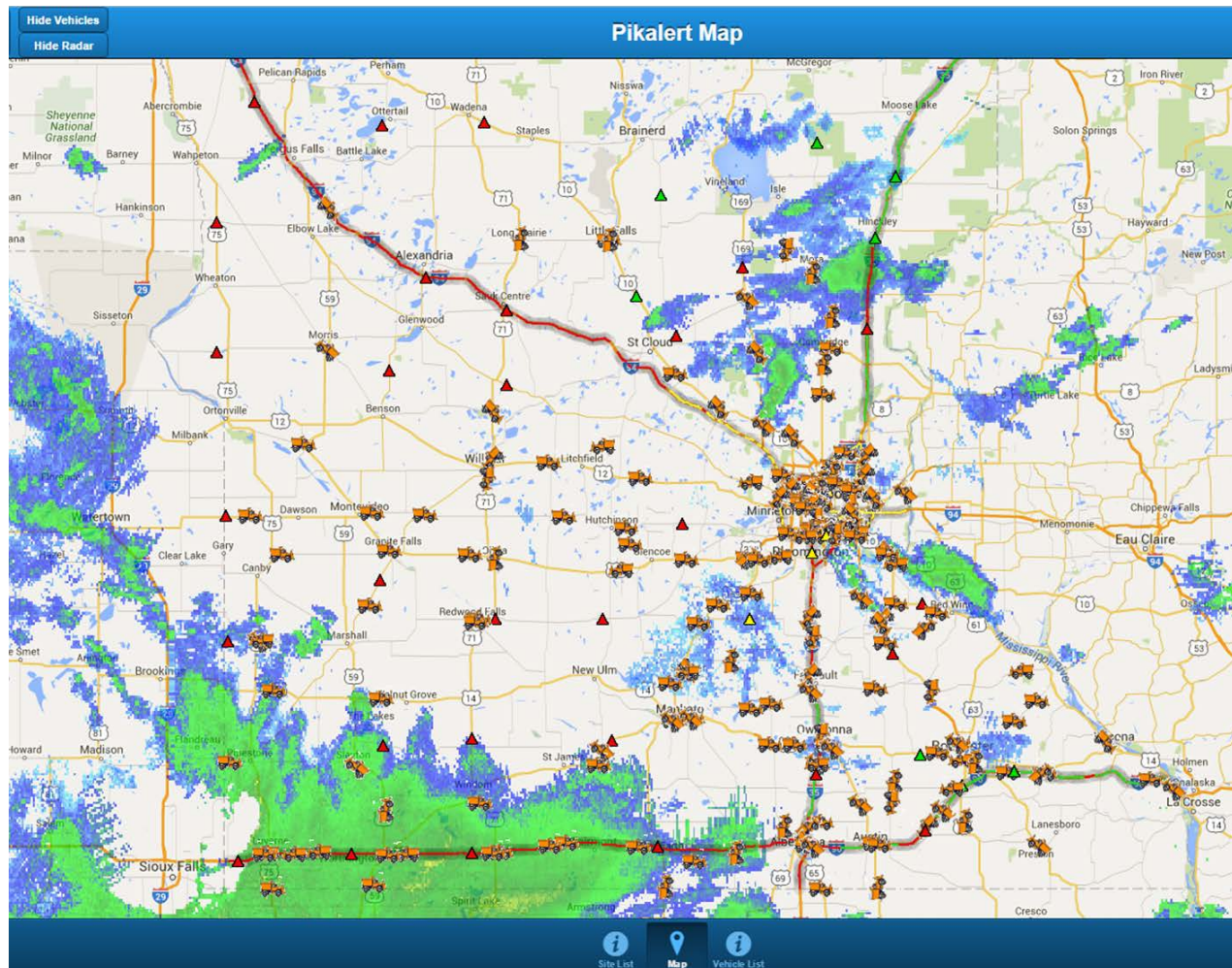


- Produces road weather forecasts and winter maintenance treatment recommendations
- Aids maintenance managers and other personnel in key decisions of treatment type, timing, rates, and locations
- The plow truck becomes a connected vehicle.

Image: USDOT



# EMDSS Display - Vehicle Locations, Radar, Road Segment Trouble Areas

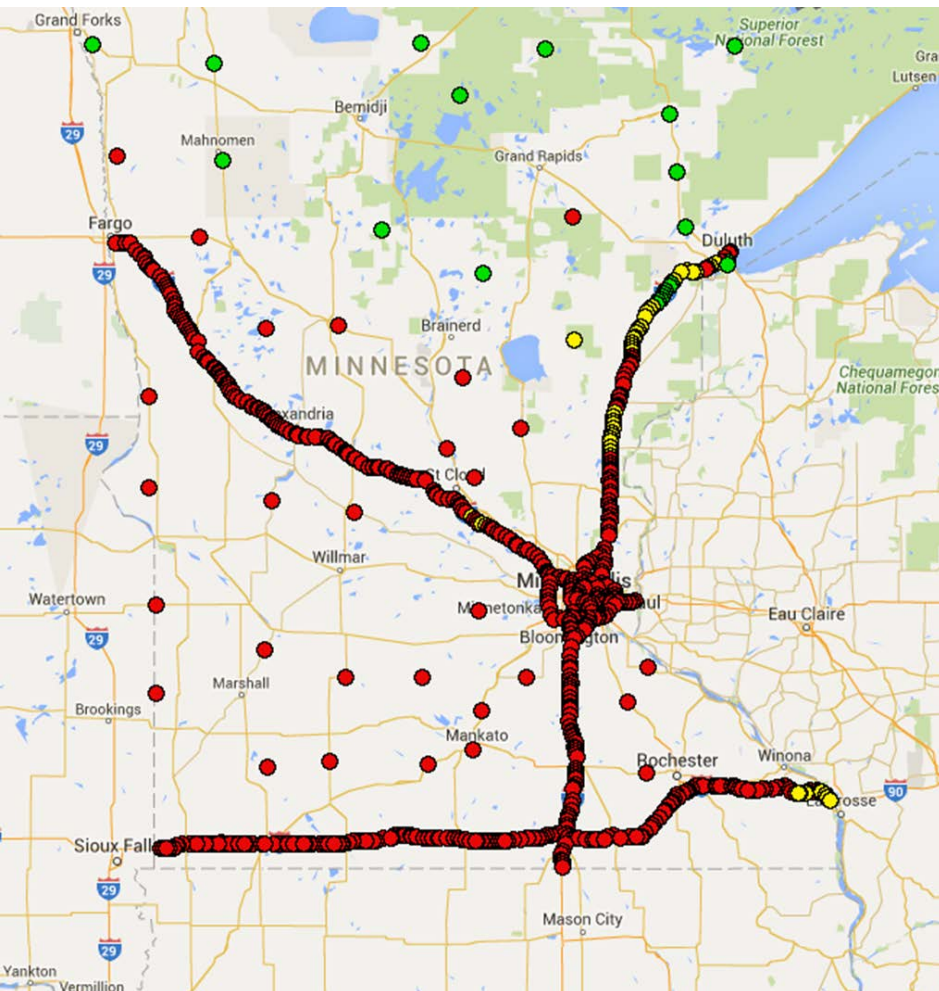


# Motorist Advisory and Warning (MAW) System

- Displays road weather alerts and hazard forecasts to decision makers ranging from DOT personnel to the traveling public
- Uses VDT output and road weather forecasts to provide these alerts
- Pre-trip: web-based display
- En-route: mobile application



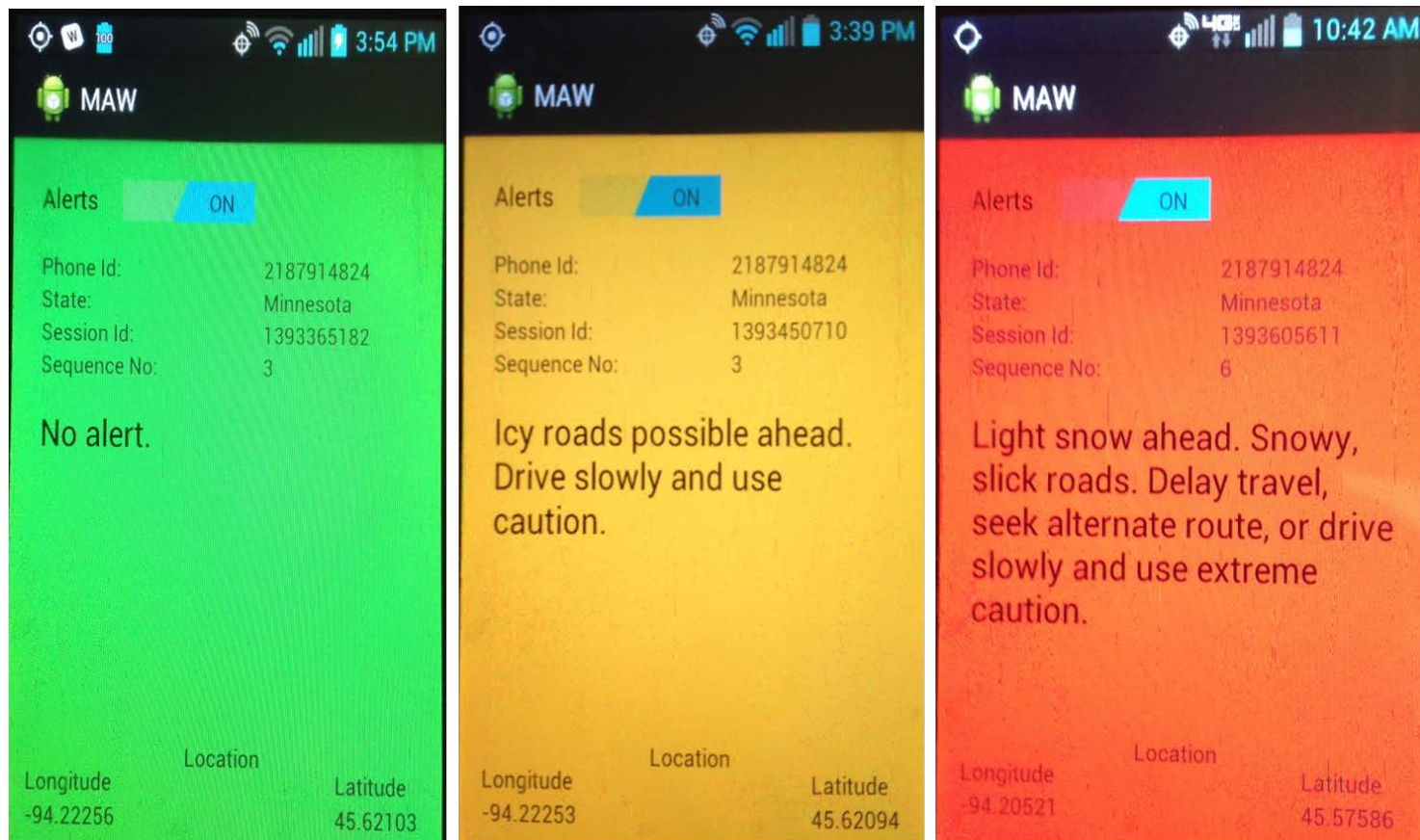
# MAW Web-based Display



New Prague MN-19 Mile Post 149		
Mon 11/30 10:25 am	●	Warning: Precip: none, Pavement: icy, Visibility: haze
Mon 11/30 11:00 am	●	Advisory: Precip: light snow, Pavement: wet, Visibility: normal
Mon 11/30 12:00 pm	●	Advisory: Precip: light snow, Pavement: wet, Visibility: normal
Mon 11/30 1:00 pm	●	Clear
Mon 11/30 2:00 pm	●	Clear
Mon 11/30 3:00 pm	●	Clear
Mon 11/30 4:00 pm	●	Clear
Mon 11/30 5:00 pm	●	Clear
Mon 11/30 6:00 pm	●	Warning: Precip: moderate snow, Pavement: slick icy, Visibility: low
Mon 11/30 7:00 pm	●	Warning: Precip: heavy snow, Pavement: slick icy, Visibility: heavy snow
Mon 11/30 8:00 pm	●	Warning: Precip: light snow, Pavement: slick icy, Visibility: normal
Mon 11/30 9:00 pm	●	Warning: Precip: light snow, Pavement: slick icy, Visibility: normal
Mon 11/30 10:00 pm	●	Warning: Precip: light snow, Pavement: slick icy, Visibility: normal

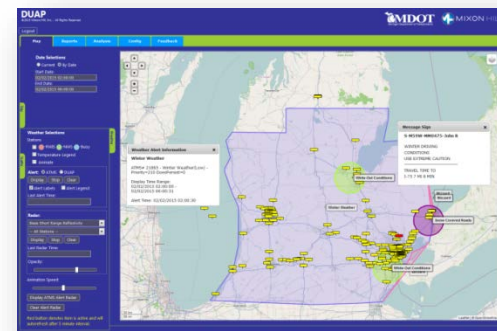
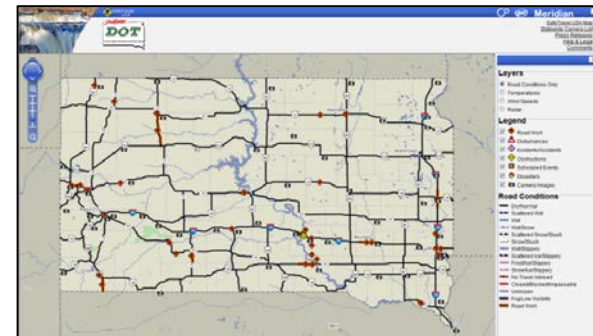


# MAW Mobile Application





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# Smarter Work Zones: an EDC-3 Initiative





# EDC-3 Smarter Work Zone Initiative

Innovative strategies designed to optimize work zone safety and mobility

## Project Coordination

Coordination within a single project and/or among multiple projects within a corridor, network, or region, and possibly across agency jurisdictions

## Technology Application

Deployment of ITS for dynamic management of work zone traffic impacts, such as queue and speed management



# Project Coordination Strategy Examples

- Region or corridor-wide software for ROW construction activity coordination
- Corridor-level Traffic Management Plans (TMPs) to address traffic-related construction impacts
- Corridor-level thresholds to minimize work zone mobility impacts
- Multi-agency construction traffic management activities

For more information check out the SWZ PC website  
<https://www.workzonesafety.org/swz/swzproject-coordination/>





# Project Coordination Tool

Work Zone Implementation Strategies Estimator (WISE)

- Developed under the SHRP2 R11 project
- Made up of two modules (planning and operations)
- Proactively reduces WZ impacts by:
  - Effective project coordination upfront in planning/programming
  - Carrying coordination through to project planning/design decisions
- Four organizations awarded grants to pilot the WISE tool
  - California – Assoc. of Monterey Bay Area Governments MPO
  - Florida – MetroPlan Orlando MPO
  - Maryland DOT
  - Tennessee DOT

**Tool and documentation available at**

<http://www.trb.org/Main/Blurbs/168143.aspx>





# Types of Technology Applications

- Real-Time Traveler Information
- Queue Warning
- Dynamic Lane Merge
- Incident Management
- Variable Speed Limits
- Automated Enforcement
- Entering/Exiting Construction Vehicle Notification
- Performance Measurement

**For more information check out the SWZ TA website**

<https://www.workzonesafety.org/swz/swztechnology-application/types-of-applications/>



# Several States are already Utilizing SWZ!

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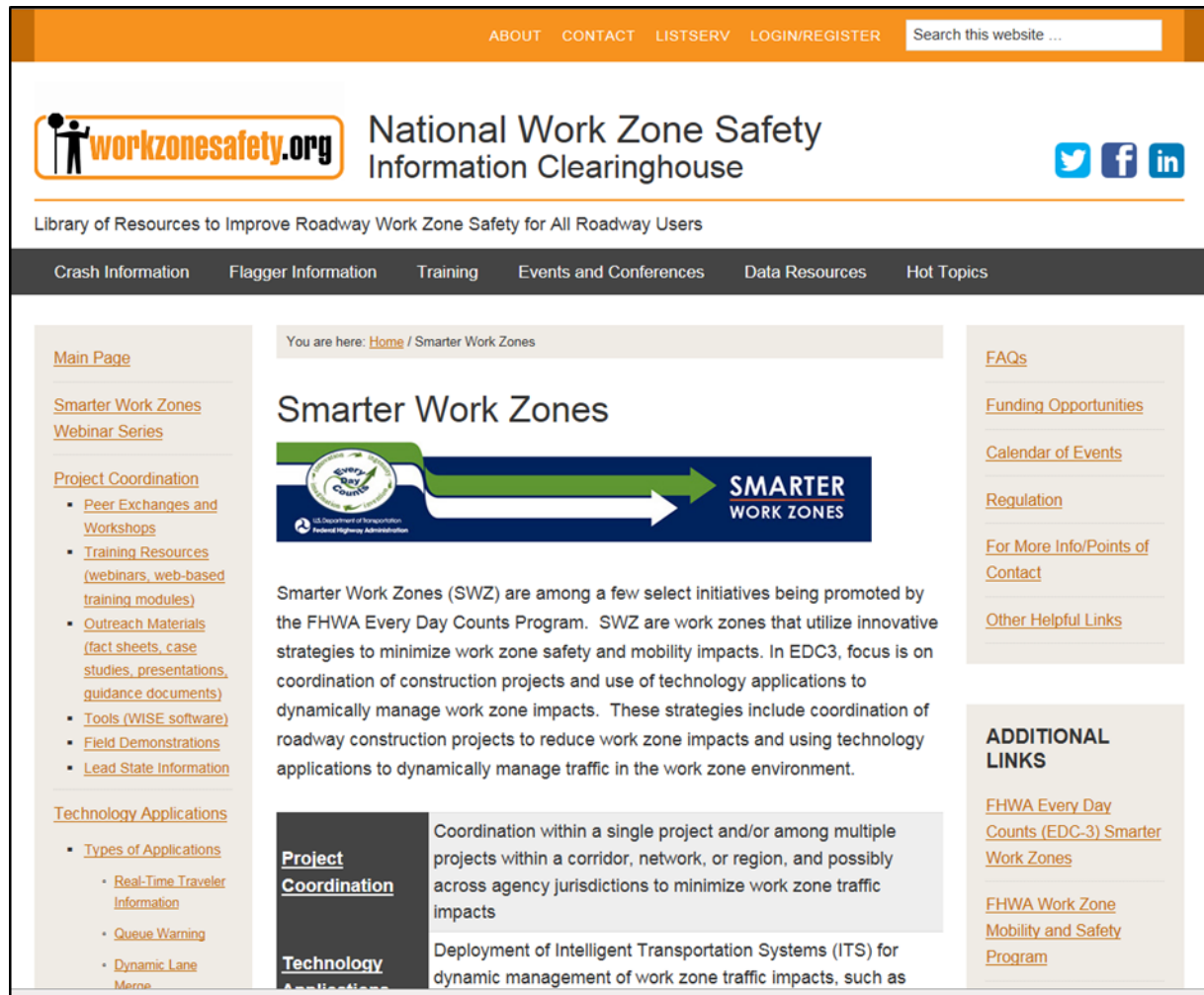
- 34 States have implemented Project Coordination strategies
- 41 States have implemented Technology Applications



# How can I gather more information?

## SWZ Interactive Toolkit

<https://www.workzonesafety.org/swz/>



ABOUT CONTACT LISTSERV LOGIN/REGISTER Search this website ...

**workzonesafety.org** National Work Zone Safety Information Clearinghouse

Library of Resources to Improve Roadway Work Zone Safety for All Roadway Users

Crash Information Flagger Information Training Events and Conferences Data Resources Hot Topics

You are here: [Home](#) / Smarter Work Zones

### Smarter Work Zones

Smarter Work Zones (SWZ) are among a few select initiatives being promoted by the FHWA Every Day Counts Program. SWZ are work zones that utilize innovative strategies to minimize work zone safety and mobility impacts. In EDC3, focus is on coordination of construction projects and use of technology applications to dynamically manage work zone impacts. These strategies include coordination of roadway construction projects to reduce work zone impacts and using technology applications to dynamically manage traffic in the work zone environment.

**Project Coordination**  
Coordination within a single project and/or among multiple projects within a corridor, network, or region, and possibly across agency jurisdictions to minimize work zone traffic impacts

**Technology Applications**  
Deployment of Intelligent Transportation Systems (ITS) for dynamic management of work zone traffic impacts, such as

**Additional Links**  
FHWA Every Day Counts (EDC-3) Smarter Work Zones  
FHWA Work Zone Mobility and Safety Program

**Other Helpful Links**  
FAQs  
Funding Opportunities  
Calendar of Events  
Regulation  
For More Info/Points of Contact

**Main Page**  
[Smarter Work Zones Webinar Series](#)  
[Project Coordination](#)  
• [Peer Exchanges and Workshops](#)  
• [Training Resources \(webinars, web-based training modules\)](#)  
• [Outreach Materials \(fact sheets, case studies, presentations, guidance documents\)](#)  
• [Tools \(WISE software\)](#)  
• [Field Demonstrations](#)  
• [Lead State Information](#)  
[Technology Applications](#)  
• [Types of Applications](#)  
• [Real-Time Traveler Information](#)  
• [Queue Warning](#)  
• [Dynamic Lane Merge](#)



# Learning Opportunities

- In-Person Workshops
- Virtual Peer Exchanges
- In-Person Peer Exchanges
- Demonstration Site Visits

**Free educational opportunities are available!**

Contact Jawad Paracha  
for more information  
202-366-4628

[jawad.paracha@dot.gov](mailto:jawad.paracha@dot.gov)

**SMARTER WORK ZONES**  
IN-PERSON WORKSHOPS

**SMARTER WORK ZONES**  
DEMONSTRATION SITE VISITS

**SMARTER WORK ZONES**  
IN-PERSON AND VIRTUAL PEER EXCHANGES

**WHAT ARE SMARTER WORK ZONES?**  
Smarter Work Zones (SWZ) is one of a few select innovations being promoted by the Federal Highway Administration's (FHWA) Every Day Counts Round 3 (EDC-3) initiative. SWZ are work zones that utilize innovative strategies to better coordinate construction projects and/or deploy innovative technology applications to dynamically manage and minimize work zone safety and mobility impacts. Visit [www.workzonesafety.org/swz](http://www.workzonesafety.org/swz) to learn more about participation opportunities and to access our archive of resource materials!

**PEER EXCHANGES**  
Peer exchanges offer agencies interested in adopting SWZ the opportunity to interact with staff in other agencies or with stakeholders who are experienced in successfully planning and deploying similar strategies and technologies. Understanding that agency needs differ, peer exchanges are customizable to best meet participant needs. Peer exchanges provide an opportunity for agencies to obtain technical assistance, ask questions, and generally learn from others while planning and implementing SWZ.

**What is included in a peer exchange?**  
• Presentations at your agency's location by one or more peer experts with experience deploying similar tools or technologies within their own region or state.  
• Facilitated, interactive discussions between expert peers and event participants to better understand how and why deployments occurred and/or how agency business processes were modified.  
• Visits to another agency to view and discuss tools and procedures that are followed when implementing SWZ, or to see deployed technologies in action through field visits. Discussions may include Q&A on how an agency has successfully implemented SWZ, lessons learned, as well as changes made over time to improve SWZ deployment. If needed, a follow-up call can be arranged to address any remaining participant questions.

**In-Person vs. Virtual Peer Exchanges—What's Best for My Agency?**  
FHWA offers the opportunity to meet in-person at a location of your choice, or virtually through FHWA's web meeting tools. In-Person Peer Exchanges—An in-person event will typically last 1 to 1.5 days. These events can involve several of your agency staff and stakeholders, meeting with one to two peer experts brought in specifically for the meeting event. A pre-developed agenda is followed to guide the discussion on the topics of interest. Conversely, a peer exchange can be arranged to bring up to three of your agency staff to meet with staff from another agency. A pre-developed agenda would again guide the discussion of topics. In these types of exchanges, the potential also exists to visit multiple work zones, allowing participants to examine SWZ technology in action.

**Virtual Peer Exchanges**—Virtual events generally last between 2 to 4 hours and are geared towards specific topics of interest. Virtual peer exchanges allow participants an in-depth look at a particular SWZ topic, as well as the inclusion of several peer experts, for comprehensive feedback. For agencies interested in multiple topics, a series of virtual peer exchanges can be made available.

U.S. Department of Transportation  
Federal Highway Administration

