

Dust Detection and Warning System

I-10 Sunshine Blvd to Picacho Peak Rd

Reza Karimvand, PE

System Technology Manager

Transportation Systems Management &
Operation Division (TSMO)

Dust Storms in Arizona

- ▶ October 2013 – dust storm related crash on I-10, **kills three people**
- ▶ Since 2000, dust has contributed to **1,207 collisions** resulting in **40 fatalities** and **1,136 injuries**.
- ▶ The ‘Season’ for dust storms in Pinal County is usually associated with the summer monsoons, but has been extending into the fall

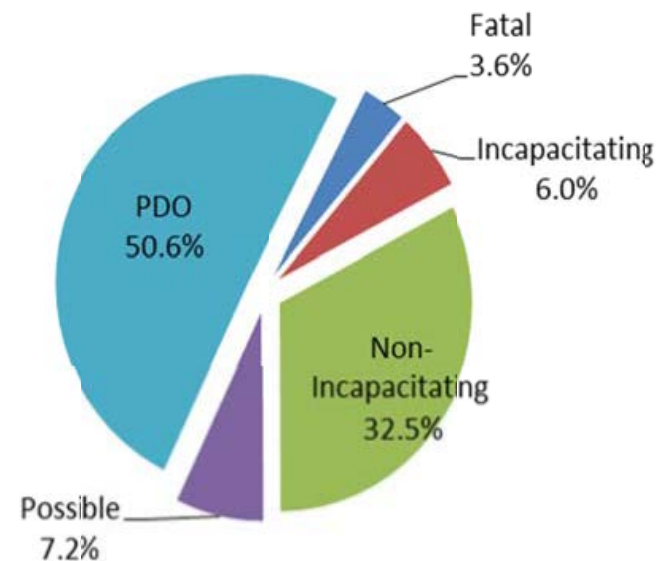


Dust Related Crashes on I-10

Aug 2010 to Aug 2015

- ▶ **3 Fatal**
- ▶ **5 Incapacitating**
- ▶ **27 Non-Incapacitating**
- ▶ **6 Possible**
- ▶ **42 Property Damage Only**

All Blowing Dust Related Crashes



83 Crashes in 5 years

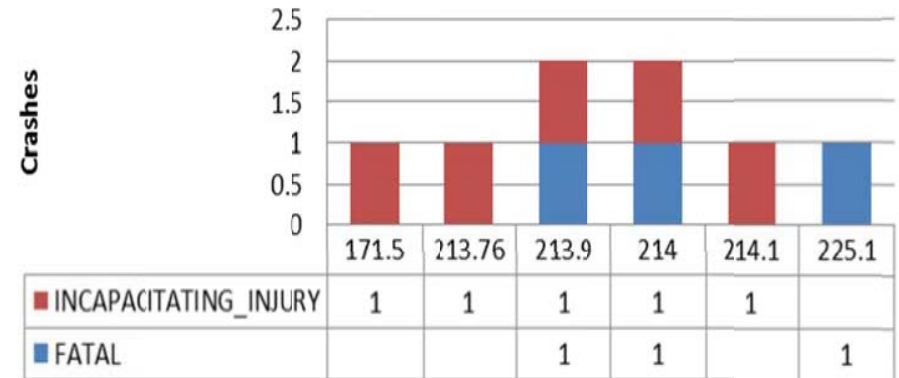
Dust Related Crashes on I-10

MP 213.6 and 214.1



Count of IncidentInjurySeverityDesc

I-10, Riggs Rd (MP 167) to Ina Rd (MP 248)



MP

- ▶ 43 of the 83 crashes occurred between MP 213.6 and 214.1

Project Background

- ▶ ADOT received federal funds to design and construct a dust warning system on I-10.
 1. HSIP
 2. Fast Lane Grant

- ▶ This project is part of larger project to realign and widen I-10 in this area.
 1. Will be Combined with the SR 87 Interchange Reconstruction Project
 2. Designed separately but will be combined and advertised as 1 project

Project Schedule

This project is on an accelerated schedule

- ▶ Clearances anticipated mid-April
- ▶ Bid Ready plans set anticipated late-May
- ▶ Advertisement in Mid June



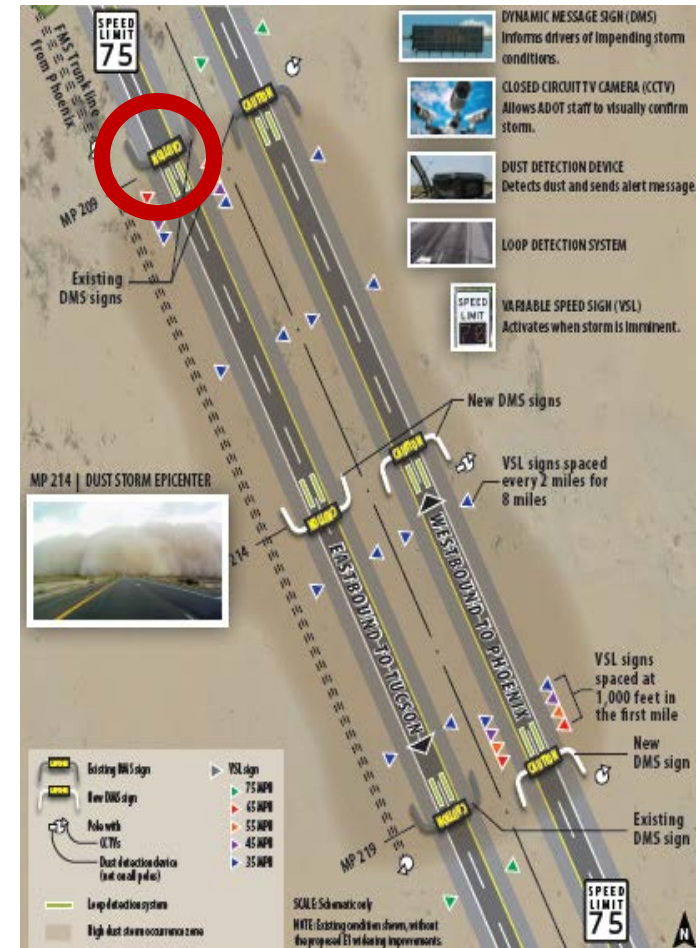
Project Objectives

- ▶ Detect dust conditions in the corridor
- ▶ Provide advance warning of blowing dust approaching the corridor
- ▶ Disseminate real-time information to motorists
 1. In the corridor
 2. Approaching the corridor
- ▶ Trigger the VSL to lower speed limit
- ▶ Provide real-time video to the TOC and DPS to confirm conditions

Project Description (MP 209-219)

Dynamic Message Signs

- ▶ Make use of existing DMS
- ▶ Roadside mounted signs and overhead mounted signs
- ▶ Provide advance notification of visibility approaching the corridor
- ▶ Can use of other purposes at other times

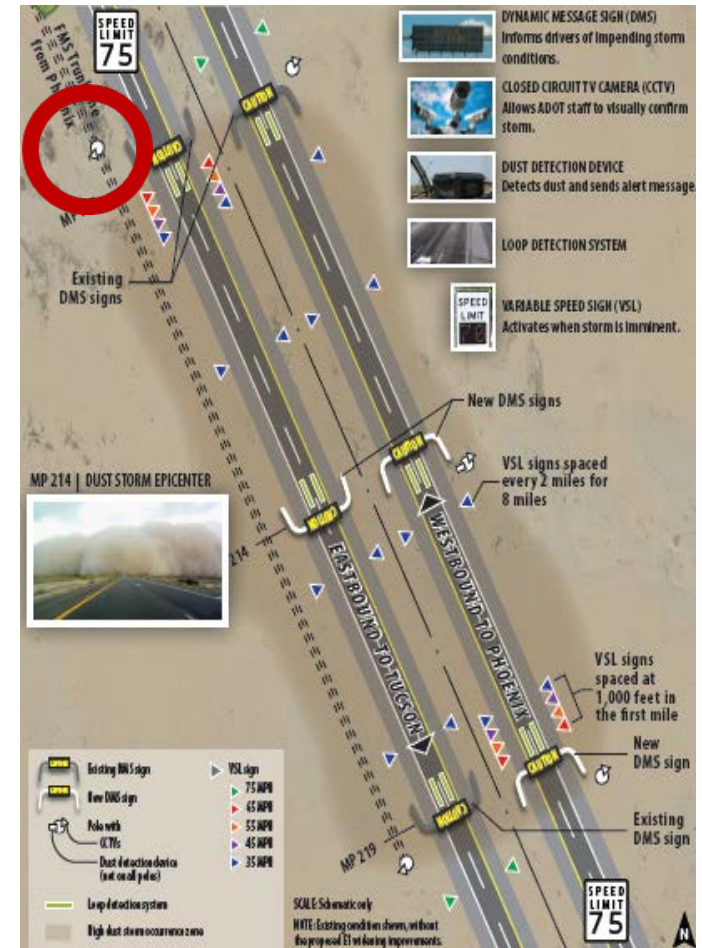


Project Description (MP 209-219)

Dynamic Message Signs

CCTV

- ▶ One CCTV every 2 miles
- ▶ Provide confirmation of road conditions in the corridor

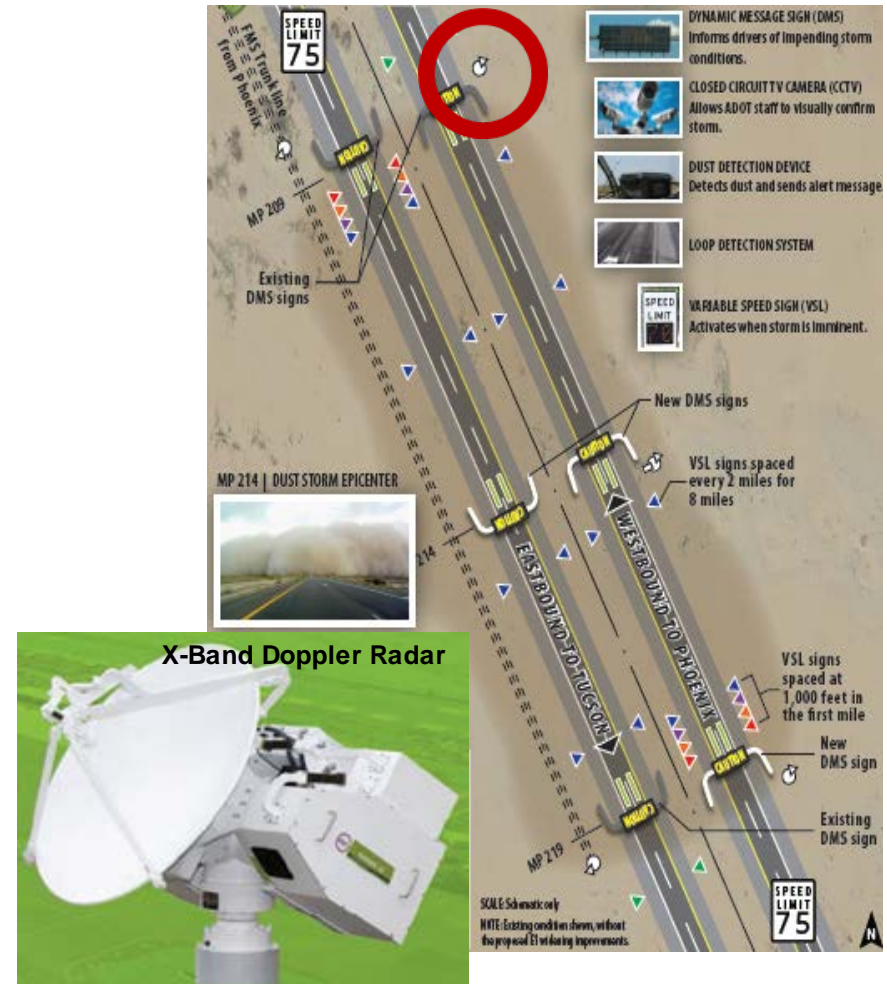


Project Description (MP 209-219)

Dynamic Message Signs
CCTV

Long Range Dust Detection

- ▶ 1 installation for the entire project
- ▶ Looks for dust and low visibility conditions within the corridor
- ▶ Located at the north end of the corridor because of the mountains to the south
- ▶ Range of 40 miles



Project Description (MP 209-219)

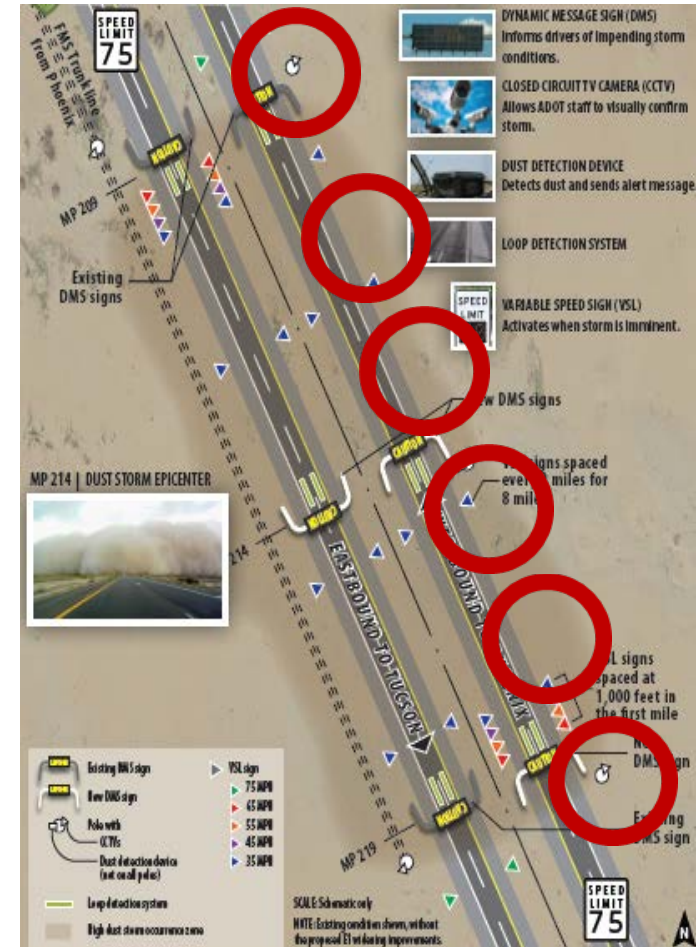
Dynamic Message Signs

CCTV

Long Range Dust Detection

Visibility Sensors in the Corridor

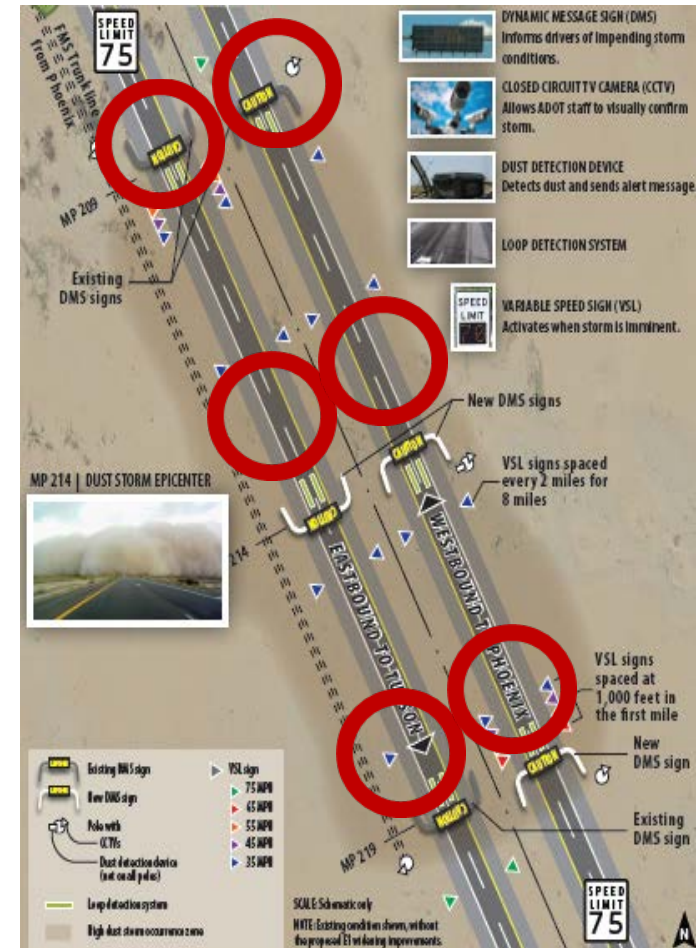
- ▶ 1 installation per mile
- ▶ 1 installation per ½ mile MP 212-214
- ▶ 13 total installations
- ▶ Forward scatter technology
- ▶ Measures visibility at a “spot” location



Project Description (MP 209-219)

Dynamic Message Signs
CCTV
Long Range Dust Detection
Visibility Sensors in the Corridor
Loop Detection

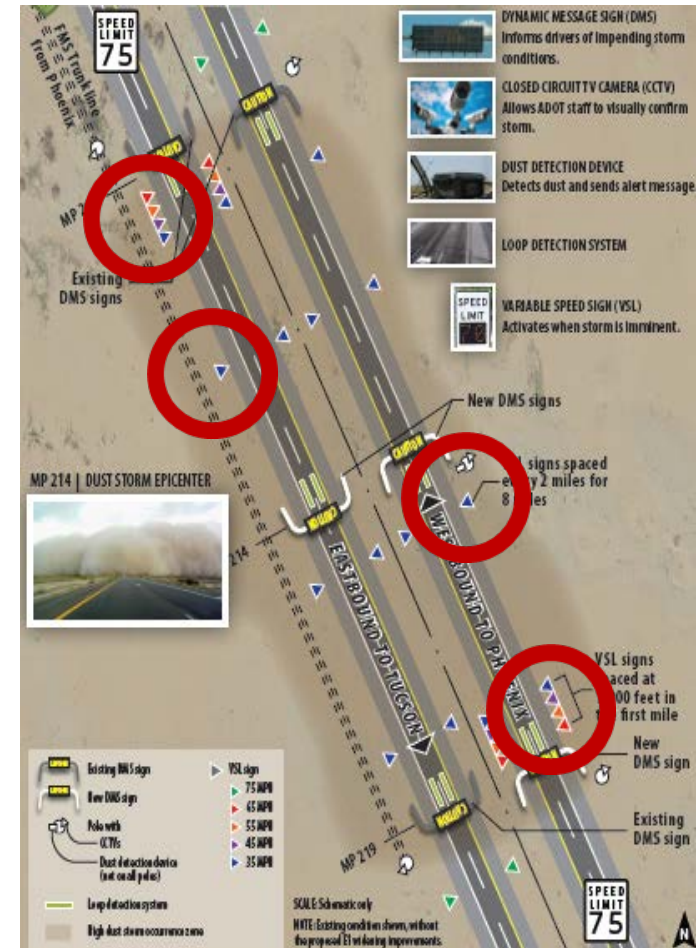
- ▶ 3 EB and 3 WB Stations
- ▶ Volume, Speed, Occupancy
- ▶ Confirm conditions in the corridor



Project Description (MP 209-219)

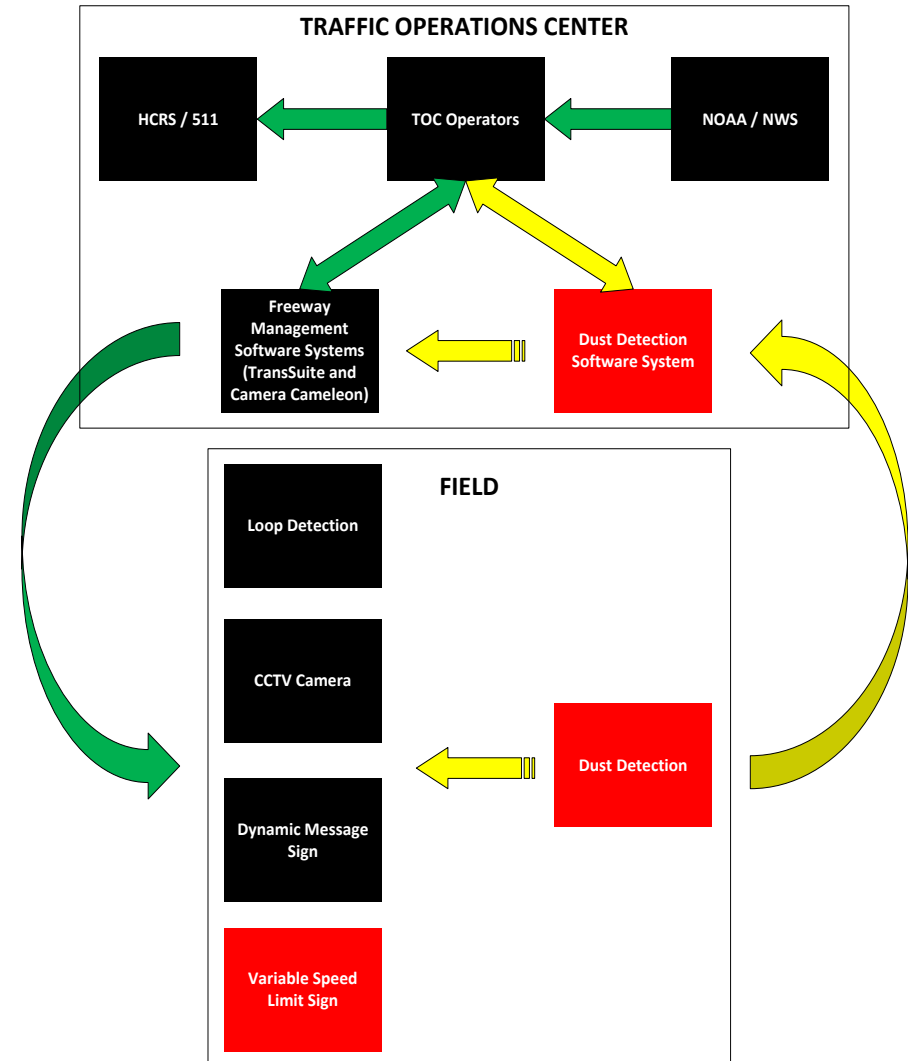
Dynamic Message Signs
CCTV
Long Range Dust Detection
Visibility Sensors in the Corridor
Loop Detection
Variable Speed Limits

- ▶ Full Matrix
- ▶ Capable of alternate text for alerts
- ▶ 3 Speed Conditions (Normal, 65, 35)
- ▶ Some Dark When Not Used



Systems Operation Overview

- ▶ New software automates system functions in response to detected weather conditions
- ▶ Example:
If spot visibility detectors detect visibility below set threshold, it will automatically:
 - Send an alert to the TOC other agencies (NWS; Pinal County; DPS; etc.)
 - Display CCTV feeds on video wall;
 - Lower speed limit with VSL
 - Display pre-defined message on DMS.



Next Steps

- ▶ **Finalized Project Assessment and 30% plans**
- ▶ **Complete all clearances, 95% and final plans**
- ▶ **Project to be advertised in 2017**
- ▶ **Project part of SR 87 Interchange Project**
- ▶ **Construction anticipated FY 2018**