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

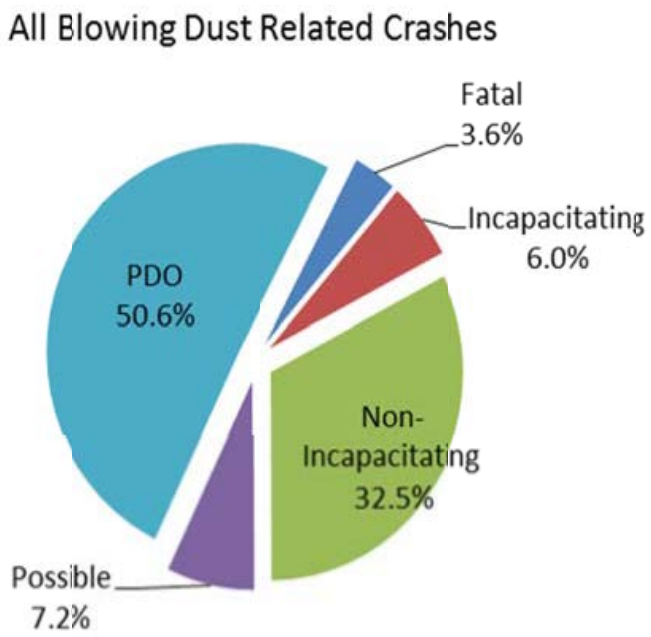
- October 2013 – dust storm related crash on I-10, **kills three people**
- Since 2000, dust has contributed to **1,207 collisions** resulting in **40 fatalities** and **1,136 injuries.**

- 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

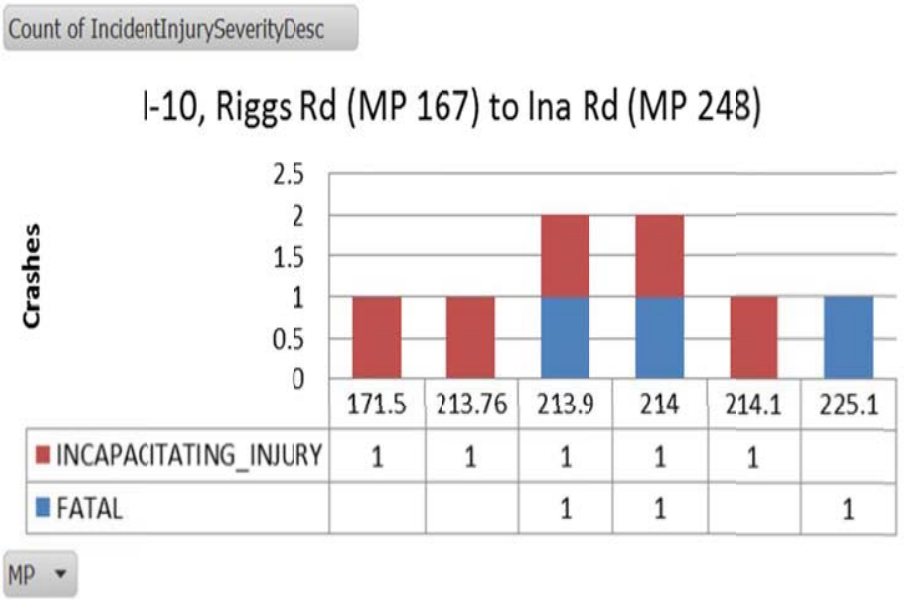
- 3 Fatal
- 5 Incapacitating
- 27 Non-Incapacitating
- 6 Possible
- 42 Property Damage Only



83 Crashes in 5 years

Dust Related Crashes on I-10

MP 213.6 and 214.1



- **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

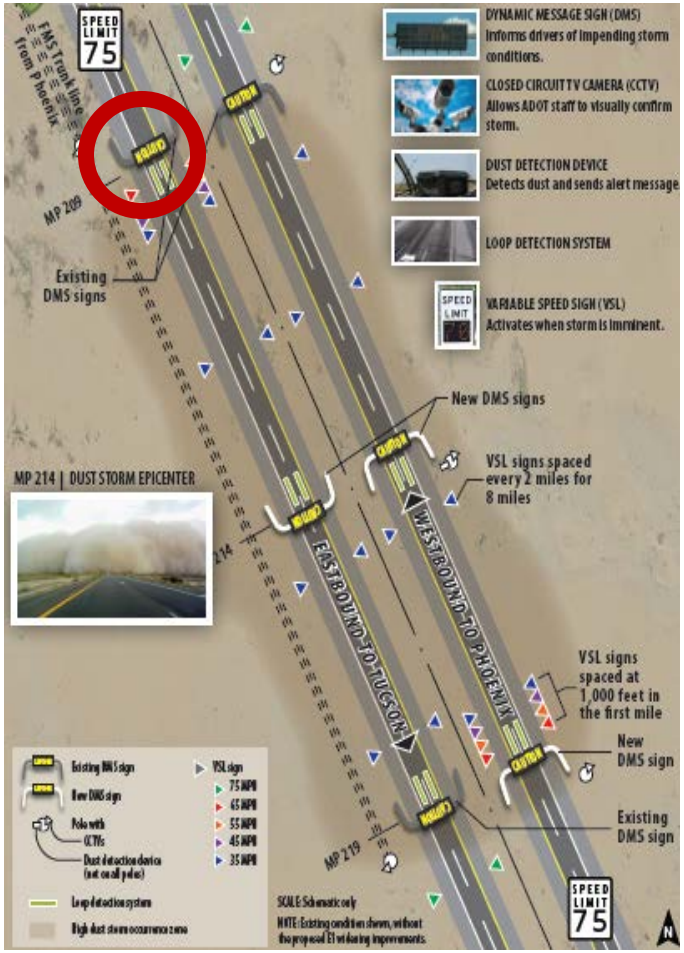
Project Objectives

- 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

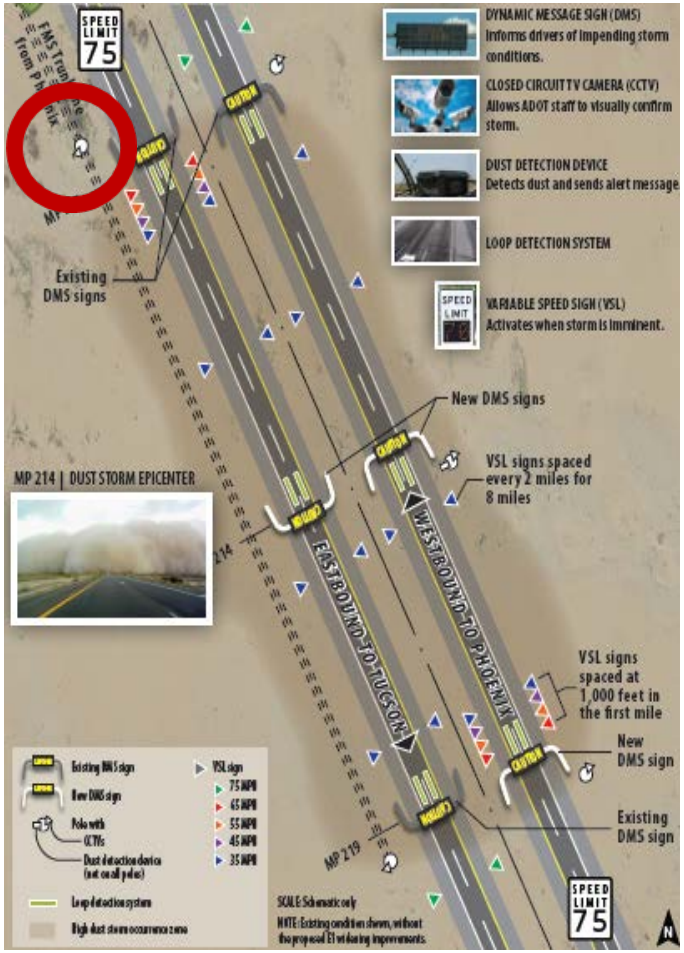


Project Description (MP 209-219)

Dynamic Message Signs

CCTV

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



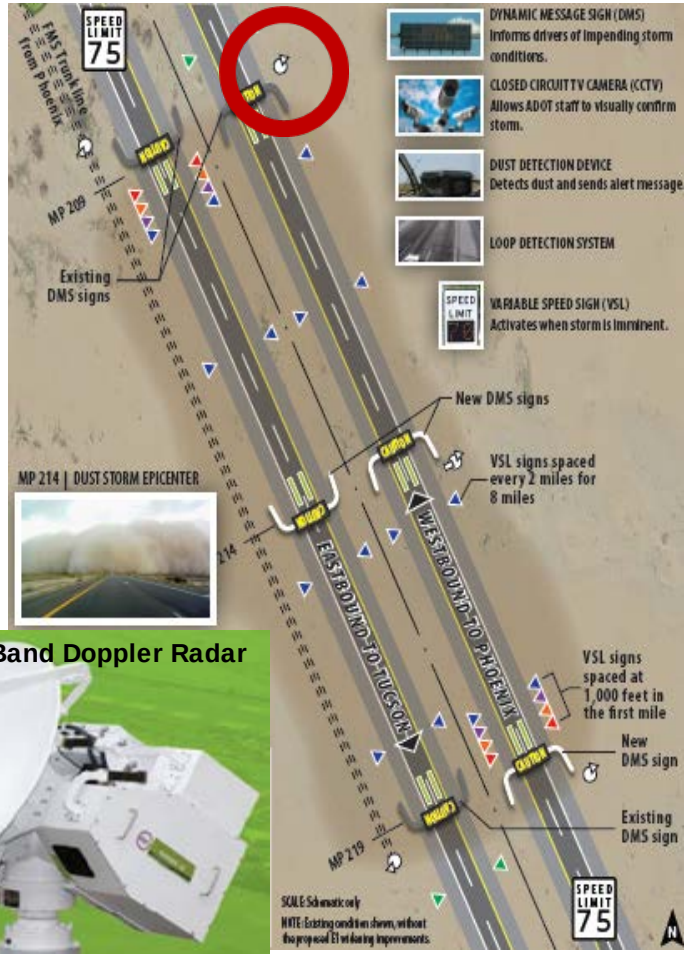
Project Description (MP 209-219)

Dynamic Message Signs

CCTV

Long Range Dust Detection

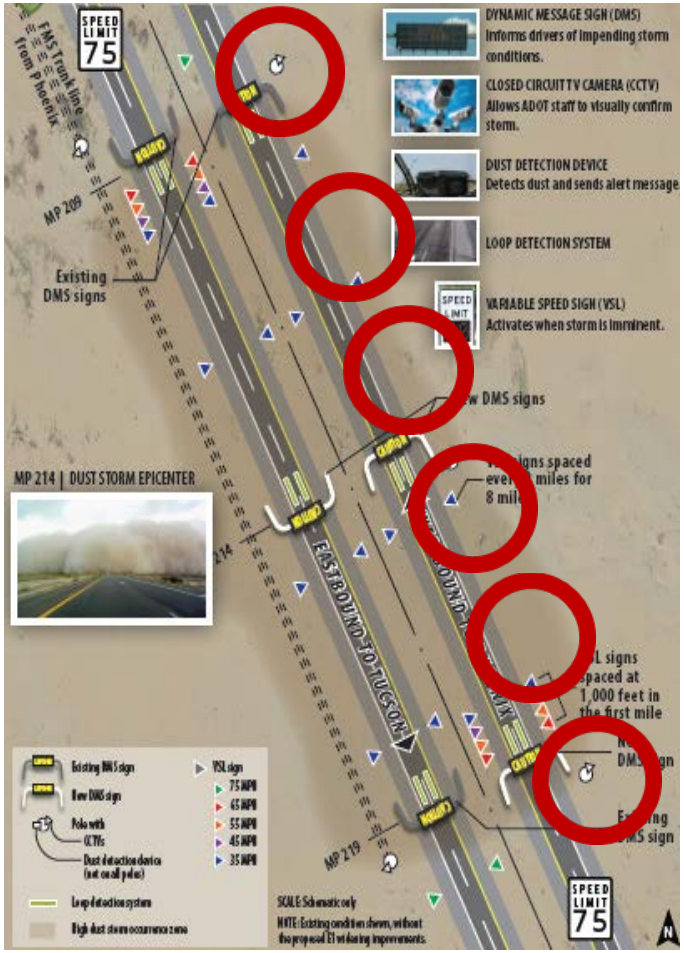
- 1 installation for the entire project
- Looks for dust and low visibility conditions within the corridor
- Located at the north end of the corridor because of the mountains to the south
- Range of 40 miles



Project Description (MP 209-219)

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

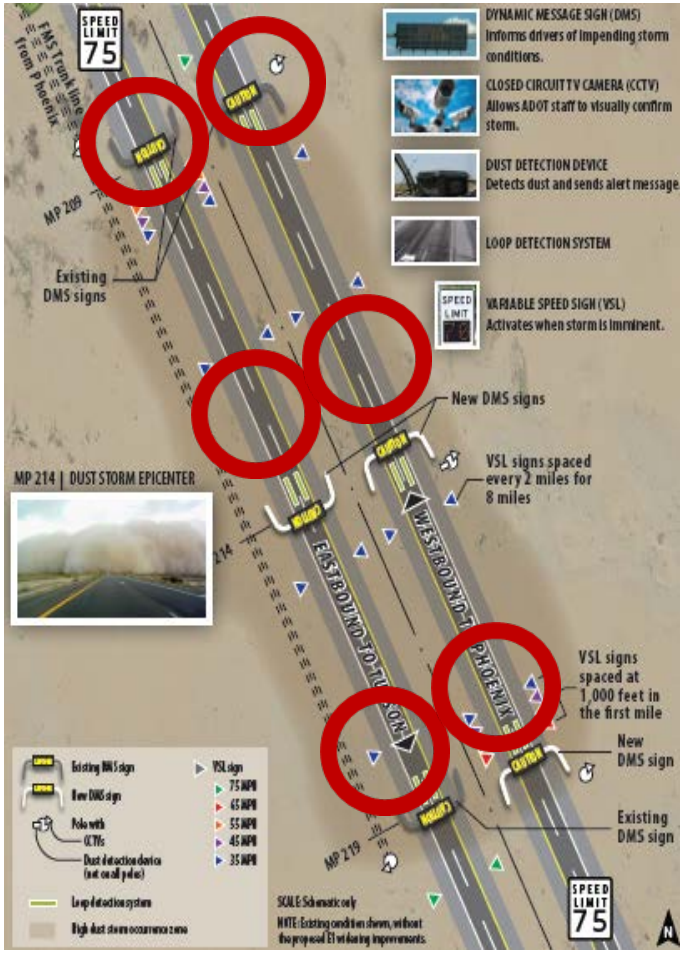
- 1 installation per mile
- 1 installation per ½ mile MP 212-214
- 13 total installations
- Forward scatter technology
- Measures visibility at a “spot” location



Project Description (MP 209-219)

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

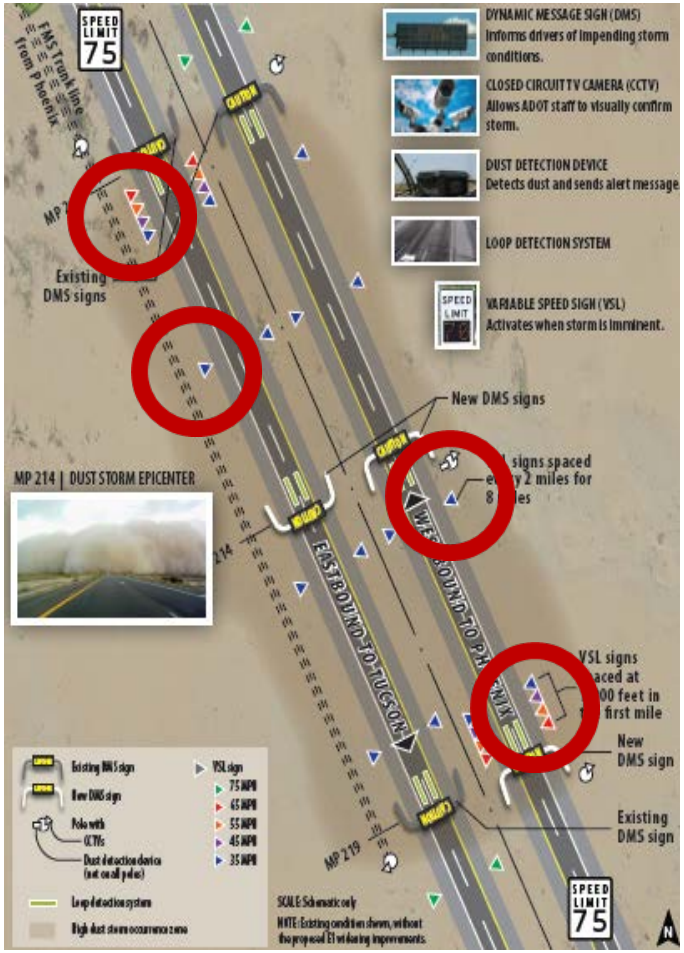
- 3 EB and 3 WB Stations
- Volume, Speed, Occupancy
- Confirm conditions in the corridor



Project Description (MP 209-219)

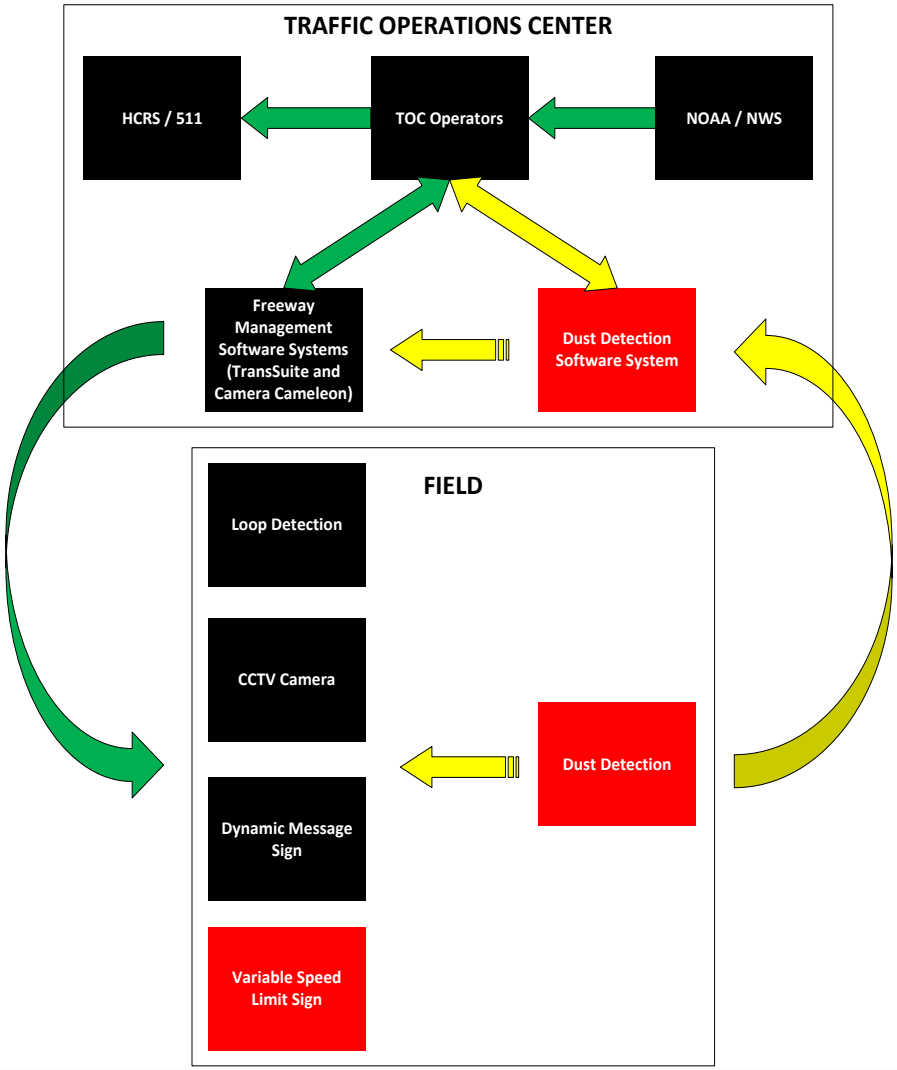
Dynamic Message Signs
CCTV
Long Range Dust Detection
Visibility Sensors in the Corridor
Loop Detection
Variable Speed Limits

- 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