

Safer driving through low visibility

How the Arizona Department of Transportation created an automated speed limit system based on Vaisala PWD visibility sensors — the first of its kind in the United States



The client:

Arizona Department of Transportation

Vaisala provided:

13 PWD10 visibility sensors

Road Weather Station RWS200



Dangerous conditions on a dusty, wind-blown highway

Arizona may have a reputation for being a warm, dry state at a low altitude, but this unique part of the US has diverse weather and various elevations. The Arizona Department of Transportation (DOT) sees it all, depending on the elevation and time of year: Snow, rain, flooding, dust storms, high winds and microbursts all occur here, each with their own road safety challenges.

One stretch of highway connects two major cities and is vulnerable to blowing dust — especially during the area's monsoon season from mid-June through September. Dust and high winds combine to drastically reduce visibility

along this road, which is a major transportation safety risk that has led to crashes. The unpredictability of the wind makes accident mitigation even more challenging.

The Department relies on an extensive road weather information system (RWIS) including 20 Vaisala Road Weather Station RWS200s for accurate conditions. Road weather awareness is only part of the solution when it comes to ensuring safety in the face of dust storms. The other part is proactive service.

After conducting a study to determine how many accidents occur that are dust-related, the Department looked for a new way to address road safety and alert drivers to hazardous conditions.

Connecting with high-performance visibility sensors

The Arizona DOT created an innovative solution based on 13 Vaisala PWD10 visibility sensors. With its off-the-shelf accuracy and reliability, the PWD10 visibility sensor is a cost-effective way to provide visibility measurement for road weather applications.

Calibrated with reference to a highly accurate transmissometer, Vaisala PWD series sensors use proven forward scatter technology to measure meteorological optical range (MOR). The downward-facing lenses protect against precipitation, spray and dust while the weather-proof design provides accurate measurements and reduces the need for maintenance.

“This is an impressive system that is making a big difference on a busy highway. Even though there are operational benefits, the main benefit is safer roads for the travelling public. We’re definitely embracing new technology, utilizing weather data and automation even more in order to keep the roads safe.”

*Kevin Duby
Statewide Road
Weather Manager, Traffic
Operations Center*



The organization easily installed the visibility sensors along the section of highway that is most prone to dust storms, along with variable speed limit signs. Next, they developed an automated, real-time system that integrates the PWD10 visibility measurements and adjusts speed limits accordingly so drivers can change their speed before traveling through hazardous conditions.

An automated solution for game-changing safety

Visibility measurements combined with an automated system that adjusts speed limits is a safety game-changer for the Arizona DOT — and the first solution of its kind in the nation.

The variable speed limit signs change depending on the current level of visibility, dropping from 75 mph to 65, 55, 45 and 35, while dynamic message signs alert travelers. Once visibility increases, the speed limits automatically raise again. Accurate visibility measurements are critical for this application, and the PWD10 sensors provide the performance the Department needs.

The solution has brought many positive results, the most important of which is safer roads — verified through data showing a reduced number of dust-related crashes.

The fully automated system also makes the Department’s job easier and more efficient by freeing staff time from managing some of their dust storm related issues.

Keep roadways safe and efficient in any season.
Achieve full road network visibility with Vaisala technologies.

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