



APPLICATION NOTE

INTELLIGENT TRANSPORTATION SYSTEM—PUBLIC SAFETY

State-wide Departments of Transportation — Enabling Electronic Highway Signage

I SITUATION

Managing today's high-volume, high-speed expressway for safe and efficient travel relies heavily on two-way, real-time information.

For this reason, many state-wide Departments of Transportation (DOT) highway traffic managers are deploying electronic signage to aid in traffic flow by alerting drivers to changing road conditions: slow-downs, accidents, construction, lane closures, weather conditions, amber alerts and travel time advisory.

Referred to as Variable Message Signs (VMS), Dynamic Message Signs (DMS), or Changeable Message Signs (CMS), these displays are large, often 500 square feet or more, and are mounted over the roadway, or at roadside.

VMSs are located strategically along the main routes, around and between cities. So there are hundreds of such displays in a state-wide operating area that must be updated accurately and in real-time.

Integrating VMS into highway traffic management is part of the Intelligent Transportation System (ITS) program, a U.S. DOT initiative to make information technology a critical component of traffic management.

ITS's goals are to improve highway safety, reduce vehicle wear, achieve better drive times, and lower fuel costs. Better informed drivers experience less stress during commutes

I WIRELESS BROADBAND SOLUTION

VMSs can connect to command centers via various roadside communications systems including telephone lines, cellular signals, fiber optic cables or radio communications.

Wi-Fi is considered a new standard for connecting signs across the region to the various DOT traffic command centers with streaming data and video. However, Wi-Fi's over-the-air performance is limited to short distances.

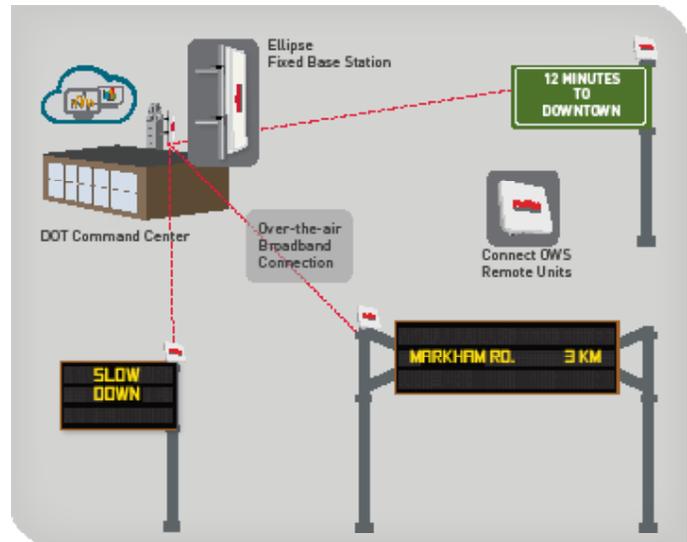
As VMS use expands, a better solution is the Redline RDL-3000 XP, a point-to-multipoint (PMP) radio system. It is a wide-area, rugged, high-performance wireless broadband system and can provide high-

speed line-of-sight (LOS) and non-line-of-sight (NLOS) connections over long distances between VMSs and the DOT command centers.

In this application, the RDL-3000 XP product solution consists of:

- The **Ellipse fixed base station** in a 90-degree sector configuration that handles fixed and nomadic terminals up to a capacity of 186.6 megabits per second (Mbps) in different frequency bands ranging from 470 MHz to 5.8 GHz, depending on regional regulations, model type and software version. Only a few base stations are needed to communicate with remote terminals over a wide area.
- The **Connect OWS remote terminal** which incorporates a smart antenna and an industrial radio is available in different models to operate in the same frequency band as the base station.

A typical Ellipse base station and Connect OWS remote connection can be 30 Mbps over 10 miles.



BENEFITS:

- DOTs can activate new VMSs quickly and at lower deployments costs than wired solutions
- Few base stations are needed to connect dozens of VMSs over a wide area, achieving reduced capex
- High reliability of the radio means low opex
- Multiple port connections on the radio accommodates VMS interface, video camera and Wi-Fi APs, thus reducing equipment costs and improving reliability



ELLIPSE FIXED SECTOR BASE STATION

- All-outdoor unit w/integrated 90 degree, high-gain antenna, 30-year MTBF
- Operates in licensed/unlicensed spectrum (470 MHz to 5.8 GHz), LOS/NLOS
- Up to 186.6 Mb/s per sector
- L2 Ethernet switch w/PoE
- NEMA-4 cabinet with 2-4 hr battery backup
- Compact size, easy-to-install and align



CONNECT OWS REMOTE TERMINAL

- RDL Connect OWS in-cabinet remote terminal w/external antenna for over-the-air connection to the base station
- Available ports for VMS, on-site video camera and Wi-Fi access point (AP)
- Compact size, easy-to-install and align