

CASE STUDY

SIERRA WIRELESS

AirLink™ Products

Grape Networks

Grape Networks, Inc. is a wireless sensor networking company serving the agricultural industry. Based in San Ramon, CA, Grape Networks has offices in France and Germany, as well as a prominent distribution partner in Australia. Grape Networks' mesh network-based management platform monitors environmental factors, such as water, temperature and the micro-climate of an area anywhere in the world via the Internet.

Business Challenge

Working with some of the largest wineries in the world, Grape Networks originally developed its portable Climate Genie™ sensor system for Beringer Vineyards in California's Napa Valley. Desiring more timely data relay than what was currently offered by the annual aerial view photo of the Beringer Vineyards, the winery asked Grape Networks to develop a way to measure important climate variations, including temperature, humidity and UV light radiation, that affect the quality of grape production.

Grape Networks' Climate Genie modules use cylindrical PVC tube housing and are powered by small batteries. Each node includes internal antenna and can accommodate up to five different sensors for measuring agricultural data. The data can then be transferred via WiFi, satellite or cellular to vintners using SMS text or email alerts that allow vintners to analyze climate changes and take the appropriate action, such as applying additional water or sulfur to specific areas of the vineyard. Because the Climate Genie is portable and can be installed directly on a grape vine, the nodes can be dispersed throughout a vineyard to ensure that vintners are receiving data across hundreds of acres and can take action to ensure consistent growth, resulting in better harvests and higher quality wines.



The Climate Genie works on a mesh network, providing more than just point-to-point communication capabilities. Nodes can send messages through other nodes within a 2000 foot range or provide backup capabilities if one of the nodes goes down. The company initially incorporated cellular phones into the solution to establish a cellular communication line, but the phones lost connectivity more often than anticipated and required manual dialing to re-establish that connection. In order to take its sensor solution the last mile and relay real-time data from the mesh networked nodes, Grape Networks needed solid wireless uplinks with more dependable uptime to ensure fast, efficient data transmission.

Sierra Wireless AirLink™ Solution

Grape Networks began incorporating the Sierra Wireless AirLink Raven X intelligent gateway for reliable, always-on connectivity on both EV-DO and EDGE/GPRS networks. The AirLink Raven X is powered by ALEOS™, the longstanding industry benchmark for reliable and feature-rich intelligence, enabling remote configuration, packet-level diagnostics and reliable network session persistence. With the auto re-set functionality built into ALEOS, the Raven X is able to automatically re-establish a lost cellular connection, which is vital to the effectiveness of Grape Networks' Climate Genie sensor system. In addition, the AirLink Raven X device provides remote monitoring capabilities to proactively measure and ensure system health, and the gateway features the AceWare™ suite of tools for remote configuration and troubleshooting.

"We can get solid cellular connectivity pretty much anywhere, which is not the case with WiFi," explained Peter Tsepeleff, founder, president & CEO of Grape Networks. "Satellite is significantly more expensive, making cellular the best option in regard to both cost and coverage."



Powered By:  ALEOS™

Beringer Vineyards is currently using 15 Climate Genie nodes throughout 20 acres of its Merlot block. A single AirLink Raven X is able to provide an Internet uplink for up to 50 nodes and cover from 100 – 200 acres of vineyard. By aggregating up to 50 nodes into one Raven X, Grape Networks is able to minimize its customer's monthly data expenses. The Raven X's embedded machine protocols and support for standard and custom serial data protocols enable simple integration with both cutting edge and legacy equipment, making for quick and simple solution deployment. The two-way communication provided by the solution allows users to automate actions - such as turning on overhead watering - when alerts are sent out warning of breached measurement thresholds. Furthermore, the Raven X's solid design makes it suitable for use in the extreme environments in which the Climate Genie is typically deployed.

"According to the largest wine producer in the world, our sensor solution is indispensable," said Tsepeleff, whose Climate Genie sensor system saves costs on lost crops, misused chemicals and labor. A general estimate for revenue production per vineyard acre can be as high as \$24,000 annually. For a 10,000 acre vineyard, a single undetected frost can wipe out grape production for an entire year, costing the vineyard hundreds of millions of dollars. The Climate Genie also forecasts mildew, the primary disease that affects vineyards, alerting the vintner to where and how often sulfur should be applied. The Grape Networks' solution cost of \$5,000 per year for up to 100 acres is negligible compared to the potential revenue loss resulting from a lost harvest.

CASE STUDY: Grape Networks

Results

Because of its success with California agriculture, Grape Networks is currently in talks with the Australian agriculture experts to implement its solution down under. Suffering from drought for several years, the Australian government is offering agriculturists \$20k for water assessment and solution deployment for a variety of crops. Grape Networks' Climate Genie helps to conserve water through its soil sensors by measuring moisture levels of six feet plus. The sensor solutions' remote monitoring and two-way communication capabilities made possible by the AirLink Raven X enable notifications to farmers, relaying when and where there is lack of water in the root system, despite how moist the surface ground appears. With the accuracy of moisture data, farmers are able to target specific locations for watering, and water only when necessary.

The Grape Networks Climate Genie system with Sierra Wireless' AirLink Raven X intelligent devices running on EDGE/GPRS and EV-DO networks have provided Beringer and other large vineyards with the following benefits:

- Reduction in potential profit loss – Automated monitoring and notifications provide ability for quick action to protect fragile crops affected by unpredictable climate change that could cause hundreds of millions of dollars in losses (\$24,000/acre x 10,000 acres = \$240,000,000)
- Reduction in labor costs – Two-way communication provided by Raven X allows users to automate actions when measurement thresholds are reached, while ALEOS' auto re-set functionality eliminates the need for manual re-dialing on lost cellular connections
- Improved quality and accuracy of data – Intelligent, cellular solution offers reliability and immediacy of data not found in a non-automated process
- On-demand access to real-time information – Environmental data is sent from the field to the Internet for viewing anytime, from anywhere in the world with a PC or Internet-enabled mobile phone
- Portability – Utilization of wireless cellular connectivity fulfills need to move and re-use sensor nodes
- Reliability & remote monitoring – ALEOS embedded intelligence within Raven X communications devices equates to lower cost of ownership by providing a single solution providing such high-level functionality as remote configuration and device maintenance, packet-level diagnostics and dependable network session persistence



Sierra Wireless - Connecting people and systems to mobile broadband networks around the world

Sierra Wireless modems and software connect people all over the world with mobile broadband networks that keep them in touch, informed, and productive from wherever they need to be. The Company offers a diverse product portfolio addressing enterprise, consumer, original equipment manufacturer, machine-to-machine, and specialized vertical industry markets. Sierra Wireless also provides professional services to customers requiring expertise in wireless design, integration, and carrier certification. For more information, please visit our website, www.sierrawireless.com



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