

# Georeferencing with an interactive pen display

—by Mike Dana, Business Development Manager, Wacom



Every year at harvest time, a plane with a multi-spectral camera flies over the vineyards in Washington and Oregon, snapping images of 3,500 acres of grapes in Ste. Michelle Wine Estates. This aerial imagery helps vine makers to analyze grape canopy density prior to harvesting, because, ultimately, the quality of the wine they make depends on it.

The aerial imagery is delivered in hundreds of 20-acre blocks and georeferenced in ESRI's ArcView software, using Wacom's interactive pen display.

The entire process—from imaging to georeferencing, mapping, and updating geodatabases—must be completed in just one month, if the conditions of the vineyard is to be known in real time. Given the short time frame, a rapid and accurate workflow is imperative.

A Wacom interactive pen display combined with ESRI software has proved to be useful to Jennifer Smythman, the winery's Precision Ag. Specialist. The Wacom pen display enhances many of the features included in the ArcView software suite.

Smythman moves quickly through editing sessions to select coordinates,



snap vertices, or place points, drawing directly on Wacom's LCD display screen. The interactive pen provides a natural feel and pixel-perfect accuracy as images are snapped into place. Smythman has had the pen for two years now; before, she used a trackball, which was not only tedious but lacked precision.

"I can complete a typical georeferencing project much faster with the Wacom pen and monitor than I would with the trackball," said Smythman. "To georeference these images, I rubber-sheet them using ortho and our vineyard outline data. I need 14 points to get each image georeferenced, and with the Wacom pen display in my workflow, I can get a lot more accuracy. These performance benefits are invaluable, especially right before harvest, our massive crunch time."

The Wacom pen display's precision is crucial for identifying differences in canopy density revealed when the aerial imagery is converted to the NDVI format (Normalized Difference Vegetation Index). NDVI displays the photosynthetic output of plants, based on their spectral bands in aerial imagery.

"We've found a correlation between the size of the canopies and the grape flavors," Smythman says. "Wine makers have different preferences for grape flavor; some like grapes with more vegetal characteristics, others prefer more fruit flavors."

The Wacom pen pinpoints plants with different fruit flavor characteristics. So accurate is the georeferencing that the vineyard can be divided into different zones of grape flavour, which can then be picked separately.

Smythman (opposite) uses an interactive pen display to georeference digital aerial imagery and mark the flavor zones with remarkable precision. With the Wacom technology, she can create original content, edit maps, and analyze geographic information easily and efficiently. And, she can do it managing data on any of her multiple monitors.

In addition to greater speed and precision, the Wacom interactive pen display provides ergonomic benefits. "My fingers don't hurt anymore," Smythman says. "Originally, I had a mouse and was having some shoulder problems. So I switched to a trackball but since I'm constantly moving, my fingers were sore. When I use the Wacom pen display, I don't have that problem."

With the Wacom pen technology, the use of georeferenced data by Ste. Michelle Wine Estates has increased steadily. The fact that field crews now use Trimble units to gather information year round to track frost problems, plan new vineyard sites, and identify pest infestations has helped as well.

"The capabilities of the Wacom pen display to georeference aerial imagery have impressed everyone here," Smythman concludes. "My overall workload has grown. At harvest time in particular there's no way I could get it all done so quickly using a standard monitor and a trackball. The Wacom pen display is a real lifesaver!"