

## What's Cool Products that are smart, make your tasks easier and provide cost or labor saving

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## Satellite on a Stick Portable, real-time thermal imaging

AN OLD ADAGE SAYS, "The most important thing a grower can put on his field is his shadow."

The second best might be a "satellite on a stick"—a portable, infrared thermal imaging system—because you cannot be everywhere all the time.

Enter the **Hawk-Eye™**. Developed and built by **Agrarius LLC** of Monterey, California, it is a much needed step toward user-friendly imaging. I found this innovation at the fifth annual **Sustainable Ag Expo** in San Luis Obispo last November. Growers can now use imaging precisely when and where they need it, so it becomes part of their daily scouting. "The grower is finally in complete control," said Hawk-Eye president **Jim Etro**.

Etro has an extensive background in thermal imaging, starting with a Navy career when he sought out Russian submarine signatures. Since then, he has followed the science into agriculture and was even a pioneer in small unmanned aerial systems (SUAS). It was then he realized the technology needed to evolve.

The slow embrace of thermal science in vineyards has not been the fault of the technology, rather bad design and marketing. Add questionable image resolution (due to altitude, cloud cover or dust) or the high cost of pushing an airplane through the air, and results can be spotty and even dated. Timeliness is a big issue because growers need accurate information quickly.

The Hawk is definitely on track because the components are simple and the results are immediate. It starts with a retractable, telescoping mast lying horizontally over the bed of a pickup. The grower can commute via freeway to the vine-

yard, then transit off-road to any desired position. Three cameras are used (visual, near- and far-infrared) and sealed in a weather/dust-resistant case.

Once on location, the case is mounted onto a pan/tilt platform attached to the telescoping mast. The electrically-powered mast mates with any standard trailer-hitch receiver, and custom mounting is available. The mast is then raised vertically and extended 50 feet, using power from the vehicle. Installing cameras to real-time imaging takes only about 10 minutes.

The operating station includes a laptop computer containing all the software for controlling the cameras (joystick-swivel and pan). There is a large file for storage and post-processing of the imagery. For the vineyard manager, the big advantage is that the image on the computer screen is actually happening, at that instant, within the camera's view. I was told the field of vision is approximately 40 acres with a 90-degree panorama, and the cameras can swivel a full 360 degrees.

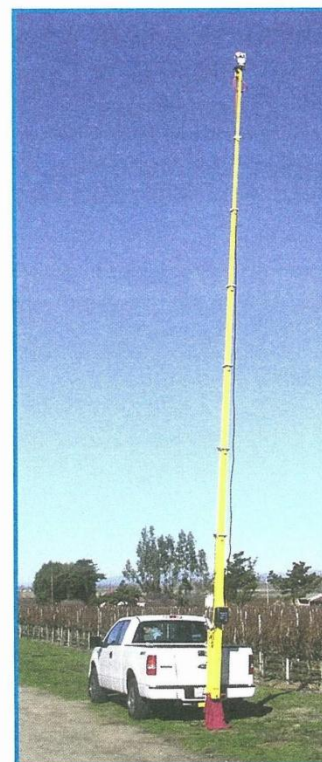
The mast is then retracted, and the vehicle then moves to the next desired location. With such a short set-up time, a manager can easily scan hundreds of acres before noon, identify and pinpoint potential issues. Thereafter he can immediately walk to the problem sites for "ground truthing."

The two infrared cameras detect different issues in the vineyard. Near-infrared wavelengths sense reflected energy. This detects how much chlorophyll is available within a plant and translates into vigor in vines.

Far-infrared senses emitted energy, and this translates into the temperature within the canopy and identifies stress. Vines under stress begin to experience increases in temperature with loss of chlorophyll and water. In addition, temperature is also an important factor in controlling powdery mildew and spider mites.



The vineyard manager drives to the exact location for thermal scouting.



The telescoping mast is extended to 50 feet and is ready for imaging in 10 minutes.



The operating station includes a laptop computer and joy-stick control of the cameras.

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By instantly having live, high-resolution pictures of 40-acre parcels, the manager can effectively scout for disease, pest and irrigation issues and monitor canopy development.

In the words of Dr. **Lowell Zelinski**, president of **Precision Ag, Inc.**, "One of the real advantages of infrared imaging is the ability to practice 'variable-rate application.' This means timely and accurate application of pesticides, fertilizers and, most importantly, water. By coordinating labor and material, the vineyard saves money."

Agrarius LLC will install the unit on your vehicle and provide operation and maintenance training. The Hawk-Eye comes with a one-year guarantee of system components plus ongoing technical support. Image analysis and interpretation are available free of charge for two months following purchase. Thereafter, this is done by simply forwarding images to company headquarters.

**What's Cool:** As late as June 2008, the **Agricultural Research Service**, an arm of the **USDA**, again expounded the value of thermography or infrared imaging. In their words, this is a great tool, "allowing growers to monitor stress, predict yield and evaluate the effectiveness of their management alternatives."

The Hawk-Eye is a real-time, on-location technology that will support the vineyard team. I would suggest that its portability and ease of operation might encourage a co-op buy-in among several growers. The science is proven so add this one to your arsenal. [wbm](http://wbm)

For more information, contact Jim Etro at 813-4-0499 or [www.agrariusLLC.com](http://www.agrariusLLC.com).

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