

# Oklahoma Company creates remote sensing system for crops

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Blue skies and technology are blending to help farmers plow more profitability into the land. Oklahoma City-based Agricultural Management Systems has developed a remote sensing system designed to pinpoint crop stress before it becomes visible.

Every time the system is used, a pilot will hop into the company's beige Aztec airplane and take off on what could be one of the most boring flying jobs imaginable — flying back and forth over a field while a sensor and camera take snapshots of the field's condition. Pilots will use a global positioning satellite system to fly at night because that's when moisture stress is easier to spot.

Such mundane flying is really thrill-flying at its best, company executives say.

That's because the system could change farming — and make the company almost \$4 million by 2003, said Stephen Paley, company president and co-inventor of the technology.

"We could create a potential revolution in agriculture," Paley said.

In the company's offices at Wiley Post Airport, associate engineer Carl Burgin clicked a mouse; the computer screen came to life with a field swept with swirls of blue, green, red and brown. Paley peered at the data gathered by the company's far infrared sensor.

He explained that cooler colors indicate lower stress from insects and other factors. The red and brown tones indicate some areas are stressed, even though the stress still can't be visually detected by a farmer or a field scout who is paid to spot trouble early.

"Ultimately we hope to detect, identify and treat stuff like this previsibly," Paley said. "This is just huge.

"We can measure stress quantitatively from the air. No one else in the world can do that."

The company will train field scouts to interpret the data. The scouts would use a global positioning satellite portable navigation system to access the data and compare one week with another.

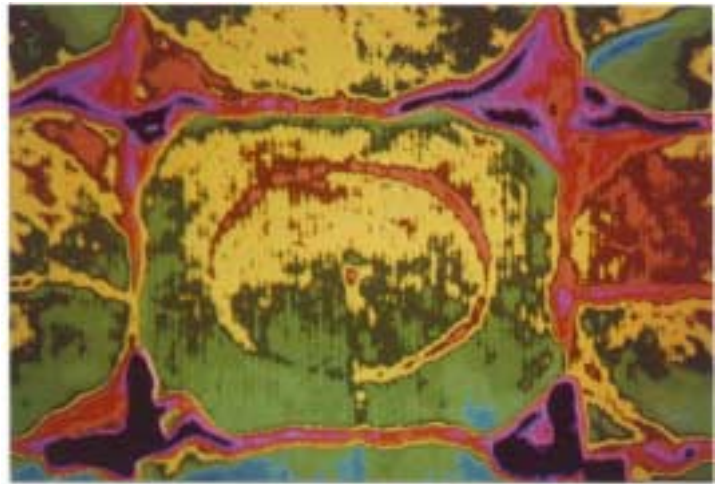
The scouts could get plant and soil samples in the areas the system identified as stressed and make early recommendations on what pesticides, herbicides or fertilizers to apply.

If insects attack part of a field, that part ideally can be sprayed before the pests spread. Or if data show one area needs a dose of fertilizer, that stressed area can get treated without the farmer having to waste chemicals on the entire field.

Paley said the company's technology allows it to look through the gas, dust and other atmospheric clutter that bothers similar remote sensing systems and can cause data to be incorrectly interpreted.

## Agricultural Revolution

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Staff photo by Paul Hellstern

This image by Agricultural Management Systems indicates the levels of stress in a field of seed potatoes in Colorado. Areas range from low stress, displayed by blue and green, to higher stress, shown in yellow and orange, to severe stress, indicated by red and brown.

The U.S. Department of Agriculture recently awarded a \$70,000 grant to the company, which plans to use the money for testing the system in California's Imperial Valley from September through November.

The idea is to try to confirm through the University of California that the system is unique, estimate how much the system can increase a farmer's profits and confirm the company's contention that the system will allow field scouts to watch as much as five times more acreage.

The company will use the system in California because farmers there plant crops on thousands of bordering acres so Agricultural Management Systems can use the plane more efficiently. The state also is especially receptive because farmers are looking for ways to increase profitability because of high energy and fertilizer costs, Paley said.

Paley said he hopes some funding may come from Oklahoma but already has seen interest from California investors.

"We've come to the point where this is going to go because we're not being ignored," Paley said. "And it's happening fast."

"Overnight, practically," Burgin added.

Oklahoma State University has developed a prototype smart machine that uses sensor technology to read plants' nitrogen needs. John Solie, a member of the development team and professor of power and machinery, said there's room in agriculture for technology being developed by universities and companies.

"I think ultimately they're going to be complementary. You'll get different information from each device," he said. "The challenge down the road is how to use this information to make decisions."

Agricultural Management Systems is based on a system developed by Paley and George Oister, executive vice president. Both men, along with Burgin, have lived in Oklahoma for many years and worked on developing a remote sensing system.

Paley has a doctorate in physics and experience contributing to the development of a system removing atmospheric distortions for the Star Wars program. Oister has a master's degree in electrical engineering and experience ranging from designing electronics for a CIA spy satellite to designing an airborne remote sensing system for oil and mineral exploration.

Agronomist Carl Spiva, a consultant for companies in California and the western United States, provides much of the company's agricultural expertise.

Next year, the company hopes to begin offering services and should begin training employees of field scouting services and chemical and fertilizer dealers to use the system's data, Burgin said. The information from the airborne system will be transmitted by radio to customers.

The customer will have to have a 12-foot antenna, buffer memory for storing data and a computer with Agricultural Management Systems software.

The forerunner to Agricultural Management Systems, Remote Sensing Services Inc., operated in the early 1980s but failed partially because the high-tech system simply didn't win the approval of the agricultural community, Paley said.

He said the technology became available before its time. Once, he said, the company had an interesting reception when representatives were introducing the system to Texas growers. One man walked up and said, "Where's your space ship parked?"

"I knew then we had an uphill marketing battle," Paley said.

This time around, the attitude is different, the technology is better and the timing may be right, Paley said.

"We hope to be an overnight success," he said, "after just 20 years at this."