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Cover story

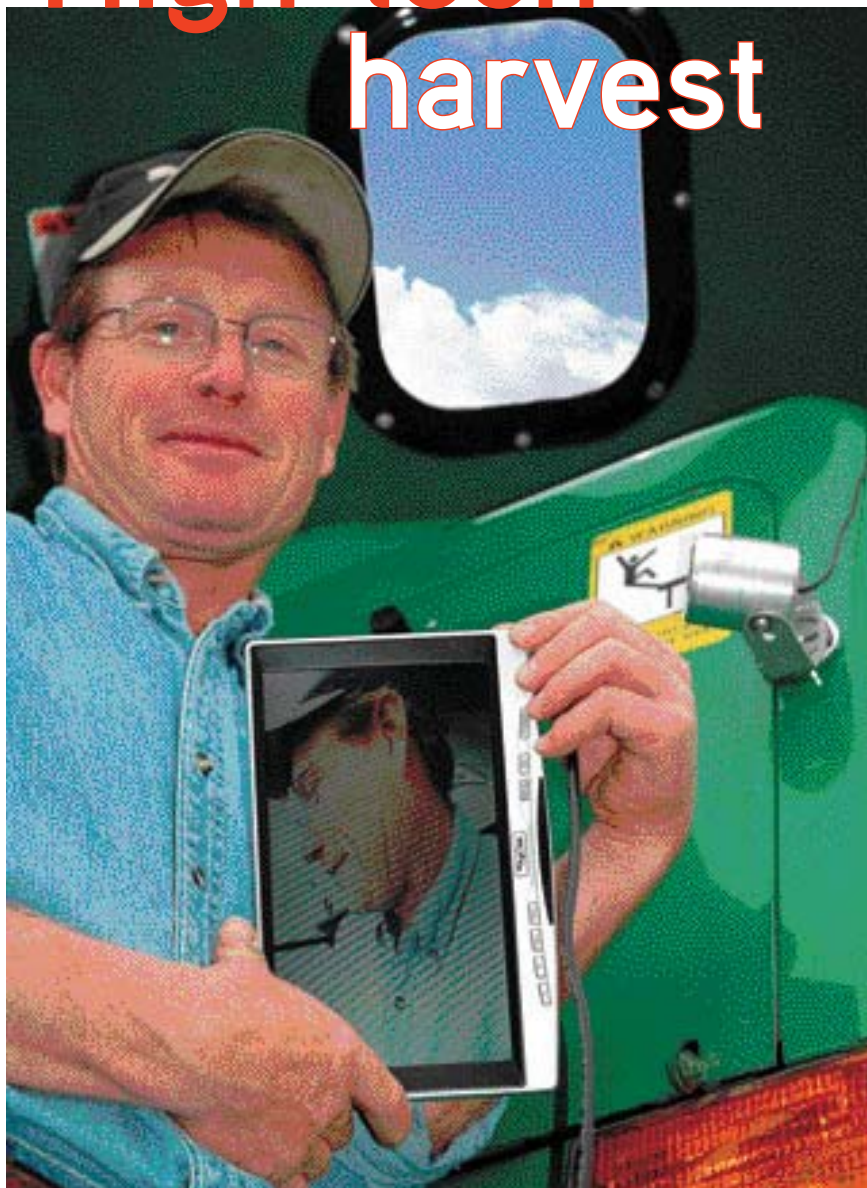
## **High-tech harvest**

Add wireless video, in-bin  
sensors to your work crew

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**Barn quilts  
draw tourists**

# High-tech harvest



Photographs: Ron Van Zee, Dave Mowitz

Two days after undergoing back surgery, Dave Rubey walked out of the hospital to tend to a delayed harvest. Unable to turn his neck, the Cayuga, North Dakotan rigged his combine with mirrors and installed a camera system to try to

maneuver his combine.

"The system's monitor had a fuzzy black-and-white image, and the cameras, which were constantly breaking down, would white out whenever they were turned toward the sun," Rubey recalls.

Advanced wireless video systems provide additional eyes to monitor harvest

By Dave Mowitz, Machinery Editor

Bruce Speich's video system works at a variety of chores from monitoring combine sieves to grain drill operation. "The system is bulletproof and portable, so it can be used anywhere," he says.



The frustration of that experience inspired Rubey to search for a better video system for agriculture.

Today, farmers like Bruce Speich employ Rubey's AgCam system for a wide range of chores from coordinating harvest unloading to monitoring dryers back home. "It provides detailed color images during the day and black-and-white images (thanks to automatic infrared illuminators) at night," says Speich, who farms with his brother, Craig, near Milner, North Dakota.

Recent advances in electronics

have spawned a plethora of advanced products like the AgCam system ([www.agcam.com](http://www.agcam.com)). They deliver truckloads of convenience from bin electronics that control drying and aeration (see pages 36 and 37) to yield monitors that also track a crop's oil or starch content (see pages 38 and 40).

#### ELECTRONIC REFINEMENTS

"Remote video systems provide a good example of the refinements that have happened in electronics recently," Rubey notes. "Not only are monitors available that provide a crisp image, but also I was able to combine advanced camera optics with rugged farmer engineering to create nearly indestructible cameras that take the worse situations farming serves up."

The basic AgCam system, made up of a camera and a 6- or 7-inch

flat-screen monitor, sells for \$1,089. Additional cameras can be bought for \$389 or a Quad Processor that shows up to four cameras at once on an 6-, 7- or 9-inch monitor.

And for wireless operation, opt for the Ranch Hand transmitter-receiver system for \$299, which allows images to be projected across a 2,500-foot field or, using a variety of antennas, up to 15 miles.

"This has allowed some of our systems' users to check grain dryer monitors at home or from within combine cabs," Rubey says.

The system is designed to "plug and play," Rubey adds, with the cameras mounted on magnetic bases and monitors using suction cups so they can be easily moved to other machinery or buildings. ■

#### SUPER-ACCURATE GPS

Last winter the European Community launched the first two of 30 satellites in their Galileo navigation system that, when in operation in 2008, will provide real-time global positioning with a margin of error of less than 4 meters. Such accuracy can now be guaranteed by the U.S. GPS system only 10% of the time. The remaining 90% of the time, the gap between what is detected and the real position of machinery rises to 25 meters.

The Galileo effort, which represents the first satellite navigation system designed for civilian purposes, is expected to bring greater accuracy to machinery guidance, as well as lower usage costs, says Giuseppe Viriglio of the European Space Agency. ■

#### THE WIRELESS COMBINE

When Illinois farm boy Tim Wilcox first started tinkering with wireless systems as an agricultural engineering student, his thoughts centered on improving communication between combines and grain carts or trucks. "Today's combines are able to fill their tanks in less than six minutes (in high-yield corn) and can off-load on-the-go in as little as two and one-half minutes," Wilcox explains. "Guessing when the best time to unload isn't good enough anymore. The grain cart operator needs to know the current fill of a combine's grain tank to coordinate unloading."

As a graduate student at the University of Illinois, Wilcox designed a wireless system for harvest using off-the-shelf parts. His engineering creativity caught the eye of John Deere. They put Wilcox to work after graduation developing advanced real-time wireless data communications.



**Tim Wilcox now spends his days developing real-time wireless communication systems for John Deere.**

Wilcox's ultimate goal is to network pieces of machinery to communicate with each other and with an operator located in a cab, at the office, or on the road. "We have the sensors and controllers available to monitor and

adjust most any operation of, say, a combine," he notes. "Now hook those devices up with more powerful on-board computers, global positioning, and wireless communication, and the sky is the limit."

The simplest application of Wilcox's vision would be for predicting where a combine will get full in the field to better coordinate unloading.

More advanced applications include tracking a load of grain exactly where it was harvested in a field and following that load through the farm and to market. "All the agronomic information about that grain recorded during planting (seed variety, fertilizer, chemical application) would be assigned to the load," Wilcox says. "This would allow you to accurately preserve the identity of the grain for marketing purposes. And the pinpoint accuracy of real-time data would provide unprecedented field mapping." ■