

## Going places with GPS

Written by Elizabeth Barrett

Thursday, 21 January 2010 15:09 - Last Updated Friday, 22 January 2010 14:31

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### **Gothenburg farmer boosts yields, relieves stress with technology.**

These days, Tim Schmeckle pores over crop data so he can increase yields in 2010.

About seven years ago, before he used global positioning satellite (GPS) technology, Schmeckle relied on what he could see to determine what areas of his corn and soybean fields needed more or less fertilizer, seed or water.

Today, the Gothenburg area farmer has yield maps in hand which are transformed into prescription plans that calculate the amount of inputs for his crops.

“I can lower the rate of fertilizer and seed in the bad areas and increase them in good areas,” he said.

The bottom line?

More profitability.

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Schmeeckle is just one of a growing number of agricultural producers who use GPS technology to calculate the actual needs of corn and other crops.

### GLOBAL POSITIONING SATELLITE TECHNOLOGY

GPS is a worldwide satellite navigational system formed by 24 satellites orbiting the earth and their corresponding receivers on the earth. The satellites orbit the earth at approximately 12,000 miles above the surface and make two complete orbits every 24 hours. The GPS satellites continuously transmit digital radio signals that contain data on the satellites location and the exact time to the earth-bound receiver. The satellites are equipped with atomic clocks that are precise to within a billionth of a second. Based on this information, the receivers

know how long it takes for the signal to reach the receiver on earth. As each signal travels at the speed of light, the longer it takes the receiver to get the signal, the further away the satellite is.

By knowing how far away a satellite is, the receiver knows it is located somewhere on the surface of an imaginary sphere centered at the satellite.

GPS can calculate the longitude and latitude of the receiver—by using three satellites—based on where the three spheres intersect.

By using four satellites, GPS can also determine altitude.

(Source: [www.webopedia.com](http://www.webopedia.com))

That may mean reduction of water and chemicals which translates into less impact on the environment, according to Hope Lewis, a precision farm specialist for Fairbanks International in Lexington.

In addition to increasing yields, Lewis said efficiency increases and waste decreases.

Schmeeckle, who describes himself as a gadget freak, became interested in GPS technology after attending a class where a manufacturer explained how it worked.

“I started researching it to see if I could justify the cost of getting a GPS system because I really wanted one,” he said.

After putting pencil to paper, the farmer found out he could gain about 7,500 more corn plants per acre with some variation because of precision planting the technology offers.

Since GPS can be used to automatically steer a tractor or combine, he said planting rows is more precise and offers the driver relief from stress.

“When you spend days in the tractor, you get used to it but you’re tired,” Schmeeckle explained, noting that without the technology, farmers guess about the location of certain rows when planting that aren’t precise.

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With the technology, a tractor or combine drives to the end of the row. An alarm then sounds to indicate to the driver that the equipment needs to be manually turned.

When planting without GPS, the farmer drives a tractor that pulls a planter, glancing back often to make sure the equipment isn't plugged.



“There are a lot of things going on when you're planting like the trash ripper plugging up,” Schmeeckle explained. “It's only natural to look back, pull the steering wheel and drive a bit off.”

That, coupled with about a two-week window of time to plant corn in late April and early May, brings about stress.

“It's a push to get it all planted and all day long you're focused on something ahead of you,” he said.

In addition to more precise planting of seed, Schmeeckle said GPS also accurately applies fertilizer and herbicide.

As his tractor or combine rolls down a row, data such as moisture content, harvest yields, elevation, time of day and other information is displayed on a computer screen in Schmeeckle's cab.

Schmeeckle marvels at how much more technologically oriented agriculture production has become in the last 10 years.

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“Some farmers don’t want to change but if they want to increase yields, that’s all part of it,” he said.

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