

# MILITARY BORN HELPS FARMERS

LEMOORE, Calif. -Satellite technology developed to give the military an advantage on the battlefield is now helping farmers on growing fields.

About 100 farmers from around the Central Valley, the Central Coast and elsewhere gathered on the Freitas cotton and tomato farm near Lemoore last week to see how satellite technology can ease the work of growing the crops that feed the world.

AutoFarm, a division of IntegriNautics of Menlo Park, Calif., demonstrated a position control system they developed for farming that relies on a global positioning satellite. AutoFarm introduced the use of the GPS 5001 AutoSteering System in the late 1990s to help farmers guide their tractors to level and grade fields, which optimizes conditions for irrigation.

This technology takes over from laser technology for leveling fields, a company representative explained.

One of the major advantages of the system is the ability to do the grading of a field in fog and in dust, said Don Ostini, a grower from Soledad, near Monterey.

"This system allows us to grade the field accurately in fog, which is a problem in the coastal area," Ostini said. "It also eliminates problems with dust. Lasers always have to be adjusted."

Joe Freitas, of Lemoore, pointed out another advantage of the satellite technology.

"Also with this system, you don't have to use a guess row, which means more productivity," he said.

Another of the difficulties to accurately grading fields is the heat, Freitas said, pointing across his field.

"Look at the heat waves rising from the ground," Freitas said. "That also interferes with accurately measuring and leveling a field."

The AutoFarm system saves time and operational expenses, Ostini said.

"With this, there is no need to survey the land, and that saves money," he said.

"This also saves time," said Clay Nordman, who grows tomatoes, corn, cotton and melons near Merced. "You can make any adjustments from the cab. With the laser system, you have to make any adjustments at the base station transmitter, which can be as far away as six miles."

The biggest advantage is the ability to get exact bed widths, more rows per acre and more timely field operations, Nordman said.

The system consists of an edge-of-field base station, GPS mast for the tractor, and an in-cab touch screen display and control. It sells for about \$45,000, said IntegriNautics engineer Kurt Zimmerman, who helped develop the system.

The system also can be used to automatically steer the tractor, which allows the farmer to concentrate on other activities while in the cab, such as surveying and mapping.

How it works: The AutoFarm system positions heavy equipment exactly by harnessing the use of a global positioning satellite, which forms the precise guidance signal. The AutoFarm system is anchored in the field by the base station reference.

The base station allows a farmer to get from the standard GPS accuracy of 50 feet to an accuracy of less than one inch.

Three GPS receivers on the tractor monitor the rolling and swaying motion of the tractor at many times a second, which is much more accurate than using an inertial unit.

This information is passed via GPS to the receiver in the base station computer, then out to the tractor. In the case of either hydraulically steered or electronically steered vehicles, the AutoFarm system is able to couple directly into the steering system and smoothly control the vehicle's steering.

It's a one-touch operation from the in-cab touch screen to achieve this steering control, the company representative said.

Several farmers present who use the AutoFarm system were positive about it and saw its short- and long-term benefits. The price was a concern for some who were not previously familiar with AutoFarm.

IntegriNautics, which was founded in 1994, brought together the world's experts in differential GPS systems to develop vehicle control systems requiring precision positioning. Its expertise is in using attitude and position to provide the highest integrity and most precise vehicle control, according to its website.

Built to operate indoors and outdoors, even in inclement weather, IntegriNautics' precision navigation devices are used in commercial and general aviation aircraft, agricultural vehicles, open-pit mining, and automobiles.



ROBERT PALOMARES/Capital Press  
IntegriNautics engineer Brian Walker demonstrates the in-cab touch screen, which controls the scraper or sprayer on the tractor.